



Full Circle

THE INDEPENDENT MAGAZINE FOR THE UBUNTU LINUX COMMUNITY

ISSUE #83 - March 2014



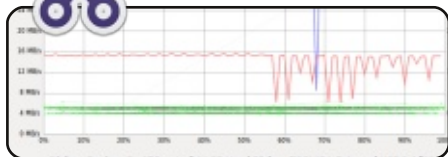
Photo: wistechcolleges (Flickr.com)

HOMEBANK FEEL GUILTY ABOUT YOUR SPENDING

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HowTo



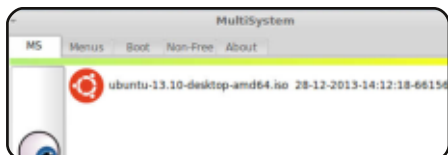
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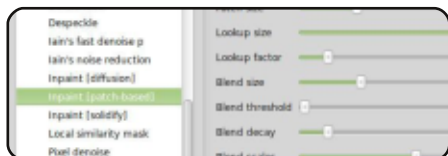
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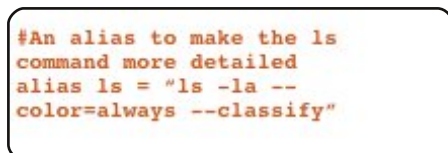
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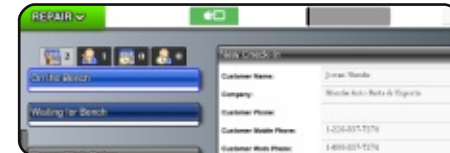
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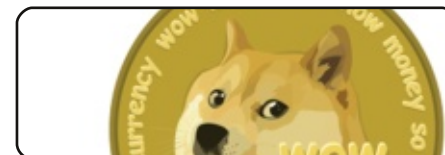
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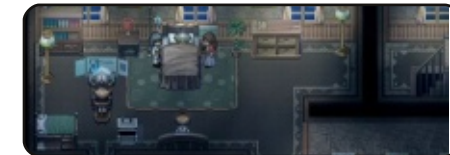
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WELCOME TO ANOTHER ISSUE OF FULL CIRCLE.

We've got LibreOffice and Inkscape for you this month, as ever. Fear not, the Blender and Python articles will return next month. In their place is an article looking at the various ways you can back up in Ubuntu (network, cloud, etc), and a short article by yours truly on using the G'MIC plug-in within GIMP. It's a hugely powerful suite of filters, but I've concentrated on InPaint which is really quite handy. Take a look. To round that up we have a great how-to on using MultiSystem to make a multiboot USB stick. Very handy!

A new section begins this month from Jens on open source design. He is quite entrenched in the KDE design group, and, this month, we have his introduction to desktop design – what it means to him, and what it should mean to you.

We're running low on security questions, so now's the time to submit those queries on bots, viruses, backdoors, and anything else you can think of. We also need your desktop screens, Linux stories, reviews, and anything else you'd like to submit. Remember: anyone is welcome to submit articles to FCM, not just the regular writers.

Speaking of reviews, we have one this month on HomeBank – a nice piece of finance software that can make you feel guilty about how much you've spent on geeky things. Hmm, maybe it's not such a good thing after all...

All the best, and keep in touch!

Ronnie

ronnie@fullcirclemagazine.org



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Full Circle Podcast

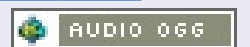
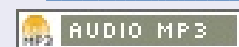
Released monthly, each episode covers all the latest Ubuntu news, opinions, reviews, interviews and listener feedback. The Side-Pod is a new addition, it's an extra (irregular) short-form podcast which is intended to be a branch of the main podcast. It's somewhere to put all the general technology and non-Ubuntu stuff that doesn't fit in the main podcast.

Hosts:

- Les Pounder
- Tony Hughes
- Jon Chamberlain
- Oliver Clark



<http://fullcirclemagazine.org>



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THIS SUMMER, YOU CAN LEARN LINUX FREE & ONLINE FROM HARVARD & MIT

Want to learn Linux? The Linux Foundation announced today that it will be offering its \$2,400 "Introduction to Linux" course for free through edX, the Harvard/MIT online learning platform that supports massive enrollment.

The Foundation's course, scheduled for sometime this summer, is intended for anyone interested in learning the open source OS, even if they have no previous experience in the subject. McPherson told us that additional edX courses from the Linux Foundation will depend on "how 'Intro to Linux' is received."

Source:
<http://venturebeat.com/2014/03/06/this-summer-you-can-learn-linux-free-online-from-harvard-mit/>
Submitted by: **Rahul Mehta**

LINUX KERNEL PATCHING GETS DYNAMIC

For much of the Linux operating system's history, patching a kernel has been a process that has typically involved downtime. In 2014, that's no longer the case as there are now at least three different efforts that all offer the promise of zero downtime kernel patching to Linux servers.

Source:
<http://www.linuxtoday.com/development/linux-kernel-patching-gets-dynamic.html>
Submitted by: **Peter Odigie**

LUBUNTU MIGHT BE THE BEST LINUX DISTRO FOR WINDOWS XP USERS

In today's open source roundup: Lubuntu could be the best replacement for Windows XP. Plus: A review of Portal 2 for Linux, and an interview with the creator of educational distro Ubermix.

Microsoft will soon end official support for Windows XP, and OMG! Ubuntu! thinks that Lubuntu could be the perfect replacement. Lubuntu is a lightweight spin of Ubuntu that provides a more traditional desktop environment and might work well for Windows XP users.

Source:
<http://www.itworld.com/open-source/409003/lubuntu-might-be-best-linux-distro-windows-xp-users>
Submitted by: **Rahul Mehta**

LINUX BUGS, BUGS EVERYWHERE

We are seeing a lot of crypto bugs surfacing lately because these libraries are suddenly getting a lot of review thanks to Snowden's revelations," suggested blogger Chris Traver. "I think one has to separate the crypto bugs from others because they are occurring in a different context". From what I have read about gnutls, though, it seems to

me that this is probably the tip of the iceberg.

Source:
<http://www.linuxinsider.com/story/Linux-Bugs-Bugs-Everywhere-80113.html#sthash.5jGpVQCk.dpuf>
Submitted by: **Rahul Mehta**

WHAT YOU NEED TO KNOW ABOUT THE GNUTLS LINUX BUG

A critical Linux bug that many are comparing to the "goto fail" problem that afflicted Apple last month was recently discovered, prompting Linux distribution and application developers to scramble to incorporate a new patch into their code.

The bug, which affects the GnuTLS library for implementing the SSL, TLS and DTLS security protocols, could cause software to falsely indicate that a particular communications connection is secure, when in fact it is not. As

with the Apple flaw, that opens the door to “man-in-the-middle” exploits where an attacker could secretly intercept and manipulate the user’s communication. The problem was discovered during a code audit last month. Red Hat then notified the other affected distributions, and a patch was released Monday.

Source:

<http://www.pcworld.com/article/2105145/what-you-need-to-know-about-the-gnutls-linux-bug.html>

Submitted by: **Rahul Mehta**

CRYTEK ANNOUNCES SUPPORT FOR LINUX

German development company Crytek, creator of Crysis and Ryse, have announced that they will be providing full native Linux support in the new CRYENGINE. Attendees to the March 2014, Game Developers Conference in San Francisco will be provided with a presentation and hands-on demos of the CRYENGINE software.

Source:

<http://www.crytek.com/news/conf>

[erence-attendees-can-also-see-a-brand-new-mobile-game-extra-engine-updates-and-much-more-at-crytek-s-booth](#)

Submitted by: **Vincent Sesto**

VALVE OPEN-SOURCES ITS DIRECTX TO OpenGL TRANSLATION SOFTWARE

Valve has made Dota 2’s Direct3D to OpenGL translation layer open source. This is the piece of code that allows Valve to take a standard DirectX Windows game that uses the Source engine (Dota 2, Team Fortress, Portal), and easily bring it over to Mac OS X or Linux/SteamOS. The code, with some tweaks, could also be made to work with other DirectX-based game engines. By open-sourcing this code, Valve is clearly encouraging developers to release OS X — and more importantly, SteamOS — ports of their Windows games.

Source:

<http://www.extremetech.com/gaming/178276-valve-open-sources-its-directx-to-opengl-translation-software-here-come-the-steam-os->

[and-linux-games](#)

Submitted by: **Rahul Mehta**

3 EASY LINUX ALTERNATIVES FOR WINDOWS XP REFUGEES WHO DON'T WANT A NEW PC

Windows XP’s refugees have two choices on April 8, when Microsoft stops supporting the decade-old operating system (for consumers, anyway). This is assuming a new PC with a new operating system (even Windows 7) is, for whatever reason, out of the question. They could cling desperately to their old Windows XP system and face what could be a hacker feeding frenzy, something we don’t recommend even if you take precautions. Or they could keep the old PC but install a new, free, and safe operating system—otherwise known as Linux.

Source:

<http://www.pcworld.com/article/2107641/3-easy-linux-alternatives-for-windows-xp-refugees-who-dont-want-a-new-pc.html>

Submitted by: **Rahul Mehta**

UBUNTU SMARTPHONES TO COST BETWEEN \$200 AND \$400, SERVE AS ‘THE FUTURE PERSONAL COMPUTING ENGINE’

The first Ubuntu smartphones are expected to hit the market later this year and will apparently cost between \$200 and \$400. Speaking at the Cebit business IT event, Canonical CEO Mark Shuttleworth revealed some more details regarding the upcoming Ubuntu smartphones, noting that they will launch in the mid- to higher-end tier. “We’re going with the higher end because we want people who are looking for a very sharp, beautiful experience and because our ambition is to be selling the future PC, the future personal computing engine,” Shuttleworth explained, as cited by The Inquirer.

Source:

<http://www.itechpost.com/articles/12134/20140313/ubuntu-smartphones-to-cost-between-200-and-400-serve-as-the-future-personal-computing-engine.htm>

Submitted by: **Rahul Mehta**

OPENSTACK'S TOP OPERATING SYSTEM IS UBUNTU

Steven J. Vaughan-Nichols from ZDNet has worked through the last OpenStack User Survey data to find that Ubuntu Linux was the most popular OpenStack operating system. Ubuntu has been working closely with OpenStack and as a result, Canonical have confirmed that 55% of OpenStack operating systems are Ubuntu, even though there is a large perception that Ubuntu is just a desktop operating system.

Source: <http://www.zdnet.com/openstacks-top-operating-system-ubuntu-linux-7000027360/>
Submitted by: **Vincent Sesto**

MOOC WATCH | BIG RUSH FOR FREE LINUX COURSE

Students have rushed to sign up to a basic course in Linux computer software being offered by US MOOC provider edX. The

Linux Foundation, which provides the course and which is now an edX partner, said 40,000 students had registered in four days.

The course, which usually costs \$US2500 (\$2750), is free, although there is a small cost for a verified certificate of achievement in the course. The course will begin in the third quarter this year.

Source: http://www.afr.com/p/national/education/mooc_watch_big_rush_for_free_linux_PSzsm1ZIMBEJhxCBAY5o4I
Submitted by: **Arnfried Walbrecht**

CHANGES OF THE PROPRIETARY DRIVER OF NVIDIA

Nvidia's proprietary drivers will with their upcoming version 343 just support the current graphics cards from the GeForce 400 series. Owners of older cards have to pick up the Legacy drivers.

Source: <http://www.ad-hoc-news.de/linux-community-de-der-proprietaere-treiber-von-nvidia--de/News/35844631>

Translated by: **Arnfried Walbrecht**

LINUX CAREERS EXPAND, PROVE LUCRATIVE FOR QUALIFIED IT PROS

There is an abundance of Linux careers, but you might not be right for the job.

The expansion of Linux and the advancement of products that run with the open source operating system have caused a need for Linux talent to fill available jobs. Demand for Linux talent has even launched salaries above industry standards.

In fact, 77% of hiring managers said hiring Linux talent is a top priority for 2014, up 7% from 2013, according to a report released by the Linux Foundation and Dice, a technology career site.

Source: <http://searchdatacenter.techtarget.com/news/2240216064/Linux-careers-expand-prove-lucrative-for-qualified-it-pros>
Submitted by: **Arnfried Walbrecht**

RED HAT'S FEDORA 21 BRIMMING WITH SECURITY, CRYPTO UPGRADES

Fedora 21, the next version of Red Hat's Fedora distribution of Linux, just received a slew of new feature approvals courtesy of the Fedora Engineering and Steering Committee.

According to Phoronix, among the most significant new changes included are a new systemwide policy for the handling of cryptography. The idea, according to Fedora's own wiki, is to "unify the crypto policies used by different applications and libraries" so that all applications running on a given Fedora system can have a consistent level of cryptography set between them.

Source: <http://www.infoworld.com/t/linux/red-hats-fedora-21-brimming-security-crypto-upgrades-238333>
Submitted by: **Arnfried Walbrecht**

GOG WILL BRING CLASSIC PC GAMES TO LINUX THIS FALL

GOG.com, a site that specializes in selling classic PC games for modern computers, has decided to support Linux after all.

GOG says it has been working on Linux support for the last few months, and will add support for the Ubuntu and Mint Linux distributions this fall with at least 100 games at launch. This not only includes classic games that ran on Linux originally, but games that never had official Linux support to begin with.

Source: <http://www.pcworld.com/article/2109143/gog-will-bring-classic-pc-games-to-linux-this-fall.html>
Submitted by: **Arnfried Walbrecht**

PROPRIETARY FIRMWARE POSES A SECURITY THREAT, UBUNTU FOUNDER SAYS

Mark Shuttleworth, the founder of the popular Ubuntu Linux distribution, believes

proprietary and unverifiable firmware code poses a serious security threat to users and he encourages hardware manufacturers to implement support for their innovations through the Linux kernel instead.

Source: <http://www.pcworld.com/article/2109267/proprietary-firmware-poses-a-security-threat-ubuntu-founder-says.html>
Submitted by: **Arnfried Walbrecht**

GOOGLE REVEALS ANDROID WEAR OPERATING SYSTEM: LINUX RULES

While Microsoft and other three-decade old companies are trying to figure out how to stop the momentum of open source, Google has become an unstoppable force which has not yet met an unmovable object. Google just revealed its seriousness about the wearable computing. The company has announced developer preview of 'Android Wear'.

Android Wear is a version of Android which is optimized for

wearable devices such as smartwatches. One of the core components of Android Wear will be Google Now. Just like Google Glass, users will be able to say "Ok Google" to activate the 'HAL' and ask questions.

Source: <http://www.muktware.com/2014/03/google-reveals-android-wear-operating-system-linux-rules/23218>
Submitted by: **Arnfried Walbrecht**

LINUX BOTNET PUSHES WINDOWS DESKTOP MALWARE

Security researchers in Europe have reported that over the past two years, as many as 25,000 web servers infected with Linux malware have been used to infect Windows desktops. The report has stated that the malware was part of "Operation Windigo", a cybercrime campaign that targets both Windows users and system administrators that support equipment for popular websites.

The report is based on research provided by ESET Antivirus,

Germany's internet security information provider CERT-Bund, The Swedish National Infrastructure for Computing, and CERN, the European Organisation for Nuclear Research.

Source: http://www.welivesecurity.com/wp-content/uploads/2014/03/operation_windigo.pdf
Submitted by: **Vincent Sesto**

LINUX WORM DARLLOZ TARGETS INTEL ARCHITECTURE TO MINE DIGITAL CURRENCY

A Linux worm variant found in the wild targets routers, set-top boxes, and now PCs in order to mine for cryptocurrency.

According to research firm Symantec, a new Internet of Things (IoT) worm was discovered last November. Dubbed Linux.Darllöz, the worm targets computers running Intel x86 architectures, as well as devices running the ARM, MIPS and PowerPC architectures, such as routers and set-top boxes.

Preloaded with usernames and passwords in order to crack into such systems, a new variation has now been found, which continuously updates and is now making money through the mining of cryptocurrency.

Source:

<http://www.zdnet.com/linux-worm-darllaz-targets-intel-architecture-to-mine-digital-currency-7000027515/>

Submitted by: **Rahul Mehta**

THE LINUX SECURITY SPELL IS BROKEN

The Linux community joins the rest of us schmucks in the sad security state as news breaks of massively infected Unix servers

Recently, security researchers at Irish think tank ESET uncovered what they're calling Operation Windigo, a Linux-capable backdoor Trojan that may have infected up to 25,000 Unix servers worldwide. Those, in turn, have been attacking up to 500,000 PCs -- like yours and mine -- on a daily basis since then. When discussing this with a reader

via email, the quote came up: "You know it's bad when even Linux machines need to worry about security." I coughed up fine, aged scotch on that one -- I figured that readers of this column would know better. Speaking of, here it comes again ...

Source:

<http://www.infoworld.com/t/cringley/the-linux-security-spell-broken-238717>

Submitted by: **Rahul Mehta**

LINUX AND BOTNETS: IT'S NOT LINUX'S FAULT!

Based on recent headlines such as "Linux worm Darllaz targets Intel architecture to mine digital currency" and "Botnet of thousands of Linux servers pumps Windows desktop malware onto web" -- you thought Linux was as full of holes as Windows XP. If you take a closer look, you'll find that Linux isn't the problem. No, the real security hole lies with some of Linux's administrators and users.

Source:

<http://www.zdnet.com/linux-and-botnets-its-not-linuxs-fault->

[7000027538/](http://www.zdnet.com/linux-and-botnets-its-not-linuxs-fault-7000027538/)

Submitted by: **Rahul Mehta**

NVIDIA REMEMBERS LINUX USERS WITH OLD VIDEO CARDS AND UPDATES THE LEGACY DRIVERS

NVIDIA has just released an update for its Legacy display driver, 304.121, bringing support for the newer kernels and one important fix.

There are lot of Linux users out there who use older video cards that can't make use of the recently released NVIDIA drivers, which don't have the proper support. That is why NVIDIA developers periodically release small updates for the Legacy branch of their drivers.

The changelog for the new update says that the compatibility with recent Linux kernels has been improved, and that a bug that prevented the NVIDIA implementation of the Xinerama extension protocol requests from being used when RandR was enabled has been fixed. The

products being supported by these drivers range from the old 6 series to the "new" 600, which was released back in 2012.

Source:

<http://news.softpedia.com/news/NVIDIA-Remembers-Linux-Users-with-Old-Video-Cards-and-Updates-the-Legacy-Drivers-431589.shtml>

Submitted by: **Silviu Stahie**

GOOGLE BUYS AN ANDROID GAMING PLATFORM, POSSIBLY WITH A SET-TOP BOX IN MIND

Green Throttle Games was late to the Android gaming platform party, and paid the price for it -- the company effectively wound down at the end of 2013. However, its efforts may not have been in vain. Google has confirmed to PandoDaily that it has acquired key parts of Green Throttle's business, including its parts, labor and two co-founders. The crew in Mountain View hasn't said what it will do with its new resources, but PandoDaily sources claim that Google wants to refine the

Bluetooth controller for its long-fabled (and possibly gaming-focused) TV set-top box. Whether or not that's true, the move suggests that Google's interest in games is extending beyond software.

Source:
<http://www.engadget.com/2014/03/12/google-buys-green-throttle-games-assets/>
 Submitted by: **Jon Fingas**

RASPBERRY PI GETS ITS OWN SOUND CARD

Besides have embedded sound card, now the Raspberry Pi gets its own sound card that can buy separately. The Pi's makers, element14, have just announced a new \$33, Wolfson-powered audio card that should give the device a broader range of functions. This new add-on sound card board is fits right onto the Pi's P5 pins and carries a Wolfson audio processor that supports high-res audio up to 24-bit / 192KHz, which can be played via a direct connection to an amp over 3.5 mm line-out or via a digital S/PDIF output.

Source:
http://www.engadget.com/2014/03/11/raspberry-pi-wolfson-audio-card/?ncid=rss_truncated&utm_campaign=sf
 Submitted by: **Sharif Sakr**

UBUNTU 14.04 LTS TO FINALLY GET IDENTICAL LOGIN AND LOCK SCREENS

It only took them a few years, but Ubuntu developers have finally managed to get the login screen to look like the lock screen and the update will ready for Ubuntu 14.04 LTS.

The Ubuntu fans have been asking for this particular feature for quite some time, but it probably wasn't a priority until now. Now, users will be able to access all the normal indications that would be available when a normal session is running in the background, just like it's possible to do before logging in.

Ubuntu 14.04 LTS (Trusty Tahr), which expected to arrive on April 17, promises to be one of the most exciting releases in quite a while and a large numbers of features

have been implemented over the course of the development cycle.

Source:
<http://news.softpedia.com/news/Ubuntu-14-04-LTS-to-Finally-Get-Identical-Login-and-Lock-Screens-431664.shtml>
 Author/written by: **Silviu Stahie**

THE NEW UBUNTU 14.04 LTS WALLPAPER IS CALLED "SURU" AND IT'S BEAUTIFUL

The Ubuntu default wallpapers have been a source of criticism from the community, with most users saying that they're just too bland. The new one that's being developed right now is a departure from the norm, although it stills "says" Ubuntu at a glance.

Former Ubuntu wallpapers have been criticized for being too bland and for not taking much bigger leaps between versions. Canonical went with consistency and it was a good decision, for the most part.

The new image even got a name, Suru, and it represents the connection between the old wallpapers and the new look and

feel. It's all about simplicity and minimalism, but at the same time it gives the impression of richness.

Source:
<http://news.softpedia.com/news/The-New-Ubuntu-14-04-LTS-Wallpaper-Is-Called-quot-Suru-quot-and-It-s-Beautiful-431506.shtml>
 Submitted by: **Silviu Stahie**



Last month I put up a link to a Google Form, in order to collect requests from readers. A great deal of you have responded already (by the time of writing, just over a week has passed). Judging by the responses already present, there seems to be a great deal of interest in how to install Linux on an external hard drive. As such, I will run through the process this month, and pick another response for next month's article.

STEP 1 – TOOLS:

Make sure your PC/Laptop supports booting from USB. If not, this article is not for you. Any UEFI devices should handle booting from USB, as well as most new BIOS machines. If in doubt, a quick Google search (or a browse through the UEFI/BIOS setup pages) will generally give you an answer.

A DVD/USB/CD of the Linux distribution you wish to install.

An external drive (either formatted for the installation, or

one you can completely wipe). If your computer can work with USB 3.0, it will help general performance.

Knowledge whether your device is a UEFI machine (Apple devices, and most Windows 8 devices are all UEFI based).

STEP 2 – BOOT FROM YOUR LIVECD:

Depending on your computer, it

may automatically try to boot from a CD if one is detected – otherwise there should be a key displayed at boot that you need to press to enter a boot menu. If this is also missing, change the order of your devices in the BIOS/UEFI Setup instead. This changes from device to device, and should be explained in the user manual for your device (or motherboard, if it's a custom machine). Worst comes to worst, the answer will probably be found with a quick Google search. If you

happen to be doing this on an Apple computer, it's the same on any model. Simply hold the alt key while the computer boots (immediately after hitting the power button, press and hold alt). It will then give you a list of devices to choose from.

If you are running a UEFI machine, make sure to choose the entry that reads “UEFI” or “EFI Boot” or anything referring to EFI. Failure to do this will result in booting a typical BIOS system, causing issues when installing an EFI bootloader.

STEP 3 – FINDING YOUR EXTERNAL DRIVE:

Once your live environment is booted, plug in the external drive (if you haven't already), and make note of the size, device (i.e. /dev/sdb), and any partitions you don't want to delete. This helps to avoid confusion when formatting the drive. After taking note of this information, you're ready to start the installation process.

```
Detected Hard disks:
```

```
AHCI controller:
```

```
1) Hard disk
```

```
Other boot devices:
```

```
f) Floppy
```

```
c) CD-ROM
```

```
l) LAN
```

```
b) Continue booting
```

STEP 4 – INSTALLATION:

This step is distribution-dependant, and is not at all different from an actual installation, save for two small notes.

Make sure the hard drive you select is the external one, and not the internal drive.

When configuring/installing a boot manager, it's best to use UUIDs, instead of device names (i.e. /dev/sdb), as they may change from machine to machine, while UUIDs will not.

STEP 5 – TESTING THE INSTALLATION:

This is similar to step 2 – instead of selecting the LiveCD though, you want to select your external drive. Give it time to boot up, and then you are free to start working (so long as no further steps are necessary to complete the installation).

NOTES:

If you plan on using this external drive on multiple machines, you may want to consider using VESA drivers

instead of anything specific to a device.

If you're in need of a USB-sized, portable Linux distribution for troubleshooting/security/peace of mind, you may be better off creating a persistent Live USB instead.

As always, I hope at least some of you have found this article both interesting and helpful. If you have any specific questions (or suggestions), feel free to email them to me at lswest34+fcml@gmail.com. Also, the form for my FCM#84 C&C article is still open, and can be found here: goo.gl/jerzKH.



Lucas has learned all he knows from repeatedly breaking his system, then having no other option but to discover how to fix it. You can email Lucas at: lswest34@gmail.com.

LIBREOFFICE SPECIAL EDITIONS:



<http://fullcirclemagazine.org/libreoffice-special-edition-volume-one/>



<http://fullcirclemagazine.org/libreoffice-special-edition-volume-two/>



<http://fullcirclemagazine.org/libreoffice-special-edition-volume-three/>

INKSCAPE SPECIAL EDITIONS:



<http://fullcirclemagazine.org/inkscape-special-edition-volume-one/>



<http://fullcirclemagazine.org/inkscape-special-edition-volume-two/>



HOW-TO

Written by Alan Ward

Don't worry Python fans. Greg will be back next month.

One of the constants in the history of desktop computing is disk prices going down over time in terms of money for the MByte. As a consequence (or is it perhaps a cause?), our disk usage for work or play has also gone steadily up. Since a large part of our digital lives could eventually be wiped out in the event of drive failure, a lot of attention has been given to the backing up of personal documents, photo libraries, music collections and other pieces of data.

But not all backup strategies are equal. In the first place, it must be easy for us to make backups. Otherwise, experience shows we will not make them at all. A perfect three-tiered backup strategy that guarantees no data loss if used correctly is, in practice, next to useless if it is not user-friendly, needs complicated command-line sequences, or just introduces yet more hassle into our digital lives.

On the other hand, a backup strategy also needs to take into account the limitations of hardware as regards space and time. Most cloud-based services are limited to about 5 GBytes of space. But filling this up from the Internet over a 1 Mbit/s asymmetrical link may take up to 37 hours of continuous uploading (I'm supposing a 384 kbit/s uplink here). So no, we will not be uploading the entire contents of our video library to Ubuntu One, and certainly not over a measly ADSL connection.

Finally, a good backup strategy must also be flexible: we need to plan for the worst, which could mean having to scrap our system completely and simply get a new one. But we will then need to get our data back on again, and usually in a bit of a hurry. Disaster almost never strikes at the most convenient time.

Fortunately enough, Ubuntu has some tips and tricks that makes it an easy operating system to back up, rather more so in fact than some others. Let's review some of

Effective Backups In Ubuntu

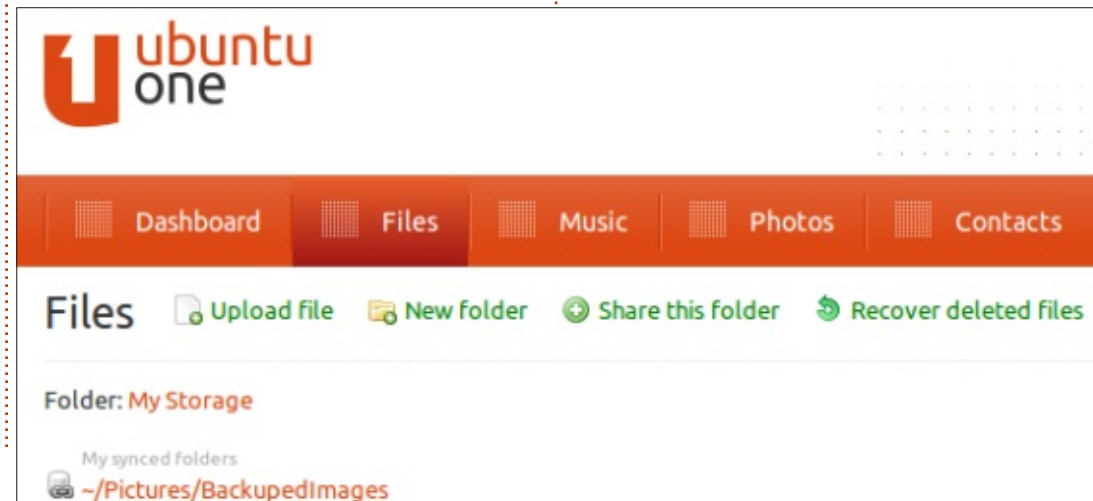
the more accessible practices.

CLOUD-BASED STORAGE

Cloud-based storage is the current fad in home (and, up to a point, business) desktop computing. You place your documents in a certain folder (for services such as Dropbox, StrongOak, Ubuntu One and many others), or even edit them directly online (Google Drive). They magically appear and are updated on all your other computers, often with download access from tablets and mobile phones as well. Easily sharing documents with other users may be an added perk.

Providers have their own professional backup plans for their servers, so once on there your backed-up documents are probably safer than anywhere else – it would take a major technological disaster to render them inaccessible.

However, when using this type of service, we should also be aware of several caveats. As mentioned above, space is limited on the cloud and transfer times tend to be slow. This limits severely its use for storing common data items such as large photo libraries or music collections, without mentioning video files or large software packages downloaded from the



HOWTO - BACKUP IN UBUNTU

Internet (e.g. Ubuntu CD images). On the security side of things, we should also be aware that all files we store in an unencrypted form may be readable by the organization behind the service. Though we may trust these people, they may eventually get hacked - or receive a subpoena to deliver access to our stuff.

Depending on the type of information we store, this may or may not be a problem. To take an example, should a general practitioner store his/her patients' medical data in the cloud? Depending on applicable law, it may be prudent to – at the very least – encrypt the data files before uploading them to a server that the user has no direct control of.

Taking these elements into account, a reasonable cloud-based backup strategy will probably focus only on documents, not other types of media. Of these, perhaps only part of the user's documents will be backed up, but not all.

Whatever strategy we apply will probably use the existing Ubuntu directory structure at some point. Most applications are already tuned to the default ~/Documents, ~/Images, ~/Downloads, etc ... directories, so we might as well use them. But on the other hand, the cloud service will be based on a single folder, for example ~/Dropbox . The simplest solution is then to use subdirectories and links to choose which files to include in the cloud backup scheme and which to exclude.

For example, we could create a BackupImages subdirectory within Pictures

```
mkdir  
~/Pictures/BackupImages
```

that we could then create a (soft) link to in the Dropbox folder

```
cd ~/Dropbox  
  
ln -s  
~/Pictures/BackupImages
```

Any files placed or modified in Pictures/BackupImages will be automatically uploaded into the cloud if we are online, or as soon as we get connectivity.

Naturally, this scheme will need to be replicated on the other machines we use to make these documents available to them as well. When doing so, it is best to pause Dropbox syncing before creating the directory and link, and start it up back again later.

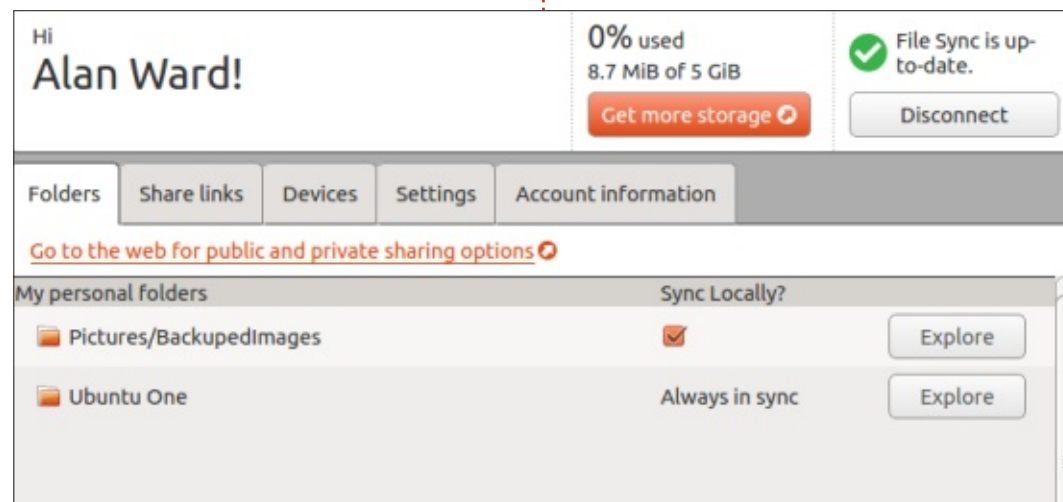
This also applies to similar services such as Canonical's Ubuntu One. However, in this particular case, you will need to use One's control panel to add the different folders you want to backup, as directly creating a link does not

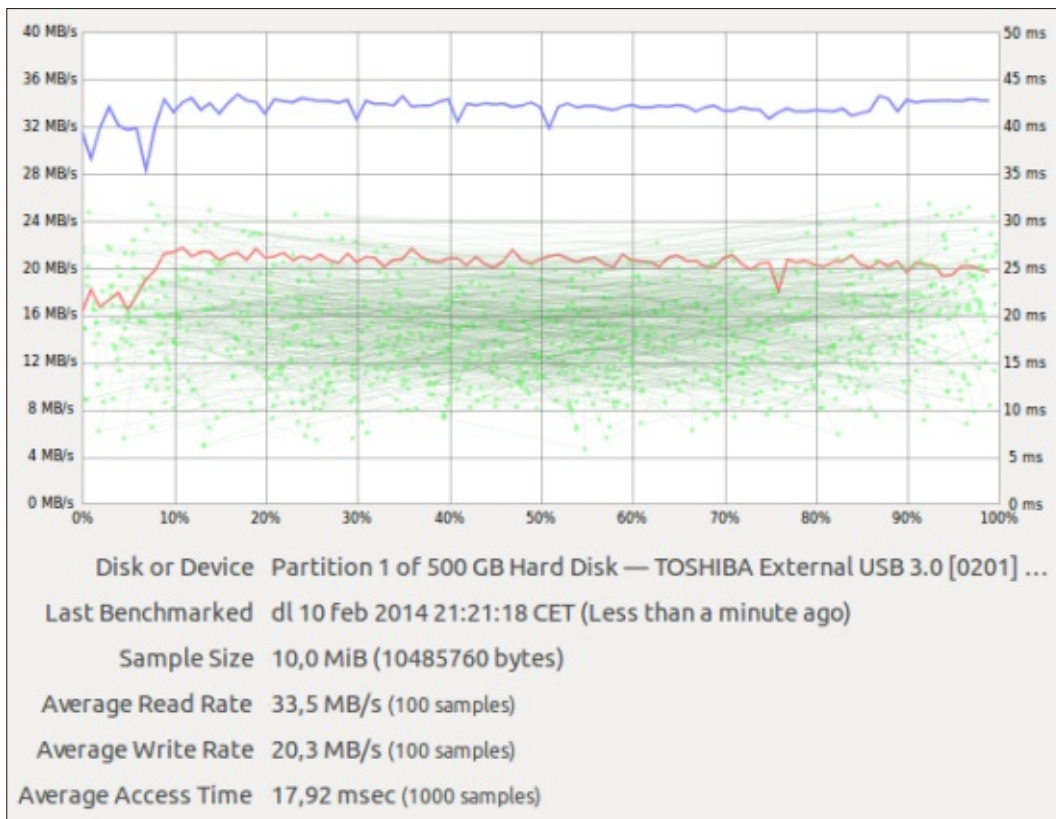
seem to work well.

It may be tempting to include the Desktop itself within the backup scheme. However, some people use our Desktop as a temporary work zone. We tend to hammer our files quite hard, e.g. while compiling programs, so we would not want each and every file change to be reflected up into the cloud clogging up our Internet access in the process. In such cases, it is best to do our work in another directory, and then copy files into the backup zone when they have reached a certain level of stability, perhaps at the end of each work day.

BACKING UP TO EXTERNAL DRIVES

External drives are relatively cheap nowadays. Many USB-connected models can be found either in the 2½" form factor, or in 3½" form. In the first case, the enclosure will contain a disk drive designed for laptops and that can usually run on 5V power supplied directly by the computer through the USB cable. In the second, it will contain a drive designed for desktop computers, that needs





both 5V and 12V power, and so will require an additional power brick (transformer). If you need compactness and wish to minimize cabling, go for the first. If you need large capacities (above 1.5 TByte and up to 3 TByte), the second type will fulfill your needs better.

Besides the disk itself, a second factor to take into account is the connection. USB version 2 connectors are rated at 480 Mb/s translates to 30 to 35 MBytes/s.

USB version 3 can in theory go up to 5 Gb/s line speed, far outstripping current spinning platter disks' read/write speeds. However, they do need both a USB 3 enclosure and a USB 3 port on the computer. Finally, other solutions also exist such as Firewire (IEEE 1394) enclosures, or the newer generation of consumer-grade NAS stations than can be accessed directly through the network. In order of speed, USB 3 and high-speed Firewire connections outstrip USB 2 and

Gigabit Ethernet (to a NAS), with Fast Ethernet (also to a NAS) a slower alternative. Needless to say, a WiFi connection to a NAS is to be avoided whenever possible: it has the lowest bandwidth, and this is shared between all users connected at the same time.

Whichever connection type you use, performance depends on both factors, the disk and the connection. It is important for the actual use of backups. Nobody wants to wait half an hour for some videos to be copied over, when, with another setup, five minutes might suffice.

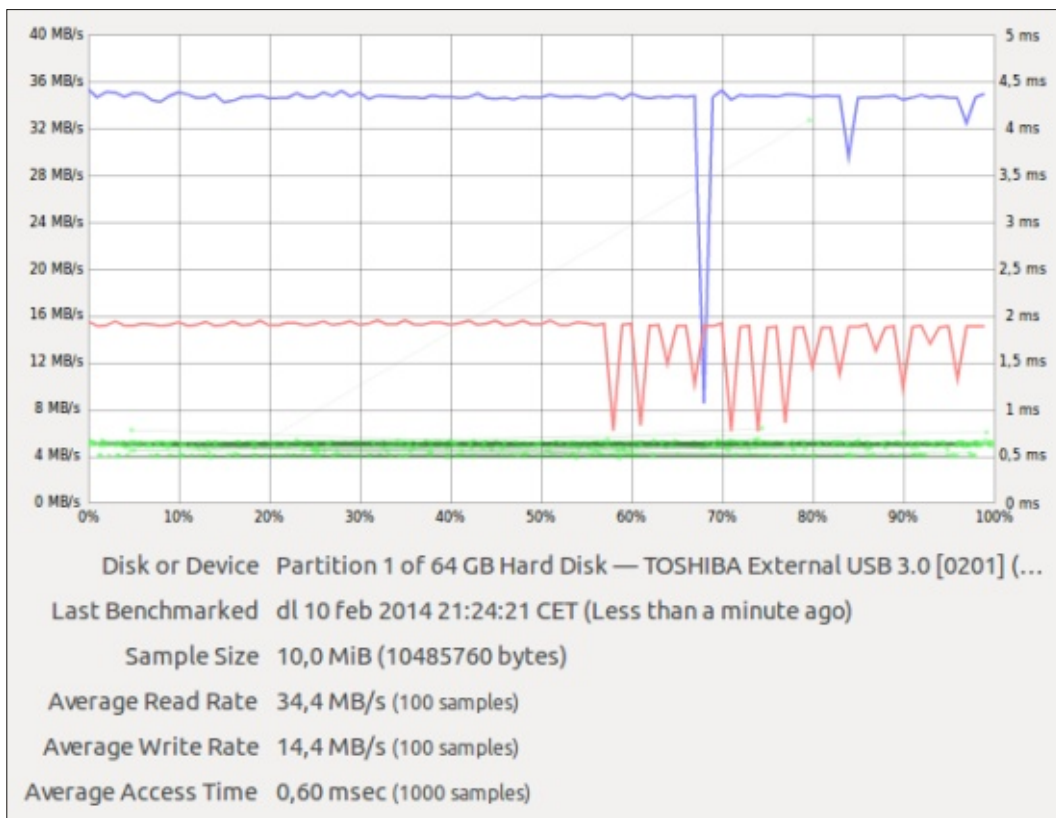
The Disks applet (gnome-disk) comes as standard on current Ubuntu distributions, and has several utilities built-in. One, the benchmark, can measure several interesting performance parameters for hard disks. Two screen captures are included here, both created with the same USB 2 adaptor but using different hard drives.

In the first (top left), we can see how a standard 500 GByte spinning platter hard drive - natively capable of reading and writing at about 100 MByte/s - is limited to 33 MByte/s

reading and 20 MByte/s writing when connected through USB 2: the USB connection is the limiting factor for transfer speeds. If we were to connect this disk using USB 3, we could expect 100 MByte/s transfer speeds (the disk's limit), though not the approximately 500 MByte/s that USB 3 is capable of pushing. If we are to transfer large files to and from this disk, these are the numbers that really matter.

On the other hand, we can also see access times in the 15 - 20 ms range. These values are rather standard for platter hard drives. They will affect backup speeds especially when transferring a large number of small files, since the disks must make a seek operation at the beginning of each transfer.

The second benchmark (next page, top left) was made with an SSD (Solid-State Disk) drive, also connected through the very same USB 2 link. In this case, we can see that transfer speeds remain essentially the same, even though the disk itself is capable of very high throughputs, probably in excess of 250 MByte/s. This is a clear case of a speedy hard drive stuck behind the bottleneck of a



slow connection: using USB 3 would definitely speed things up considerably when transferring large files - even more noticeably so than with the preceding spinning platter unit.

On the other hand, we can also see how access times are greatly reduced, to the sub-1ms range. This means that using an SSD, even behind a slow USB 2 connection, is still worthwhile when transferring a lot of very small files. Access to each file to initiate each individual

transfer happens more quickly. This advantage can also be retained when using a faster connection such as USB 3.

The general take-home idea is that, in each backup situation, we should take into account not only the hardware aspects, but also the kind (size and number) of files to be transferred in order to decide on the external disk units and connection technology to be used. In general, however, one can almost never go wrong in buying

the fastest and largest disks one can afford at a given time.

This being said, we can also decide on several different software approaches to perform the actual file transfer.

From a personal standpoint, I tend to avoid the use of compressed files (ZIP or gzipped TAR archives), preferring simply to clone the file and directory hierarchy on the backup. This way, it is easier to navigate through the backup and retrieve a single file or several files if needed, without having to uncompress a complete disk image.

To make such a plain file system backup, several strategies can be used. The easiest is simply to copy over the complete directory tree, replicating both new files and those already existing in the backup. A more advanced option would be to copy over only new or modified files, reducing backup times by not transferring existing files. This second approach can be performed either by hand (slow and error prone), or using an automated system (quicker).

rsync is a utility that has been

included in most GNU/Linux distributions for some time now. Originally designed to perform remote synchronization operations - as its name indicates - it is also very effective to do local backups to an external drive. Supposing that we wish to backup the complete contents of our user's home directory /home/alan to an external drive that is mounted on /media/alan/backups, we could issue:

```
rsync -aruv /home/alan/*  
/media/alan/backups/
```

and it will take care of the complete backup for us. Output shows us which files are being transferred at each step.

On the other hand, if we should need to recover backed up files - for example, when "populating" a new or freshly-formatted computer - we can reverse the process with:

```
rsync -aruv  
/media/alan/backups/*  
/home/alan/
```

As you can see, it is in fact indifferent whether our /home directory is mounted as a separate partition or not, though it is

certainly of good practice to do so.

SYNCING FILES BETWEEN TWO COMPUTERS

In this day and age, many of us are the happy owners of not one, but two or more computers. When older machines are replaced by newer ones, they are not always sold off. The economics of the consumer market are set up so that selling a computer with, say, three to five years of continuous use on it will not net us much cash.

But such older machines, while not quite as fast, may in many cases still function quite well as secondary or backup machines. Actual flavours of Ubuntu (or perhaps Lubuntu or Xubuntu) work quite well on a 2008 dual-core or suchlike. If the computer itself has no major hardware issues, the only part that may need replacing in order to convert it into a backup unit would be a larger hard disk drive, though this may not even be the case depending on your storage needs. Actually, this could be a good way to get even more service out of a laptop with a broken screen or a dead battery.

A strategy that has worked quite well for me is to actually clone my various computers, and keep a complete copy of all of my files on each computer at all times. This way, I can choose one or the other for any given task, taking into account only the needs of that particular task (do I need the fast CPU? Or the large screen? Or the little, light 'un to carry around all day?) and not the availability of data files. My data is always available to me.

Having accumulated several hundreds of GigaBytes over the years, copying over all the files

over WiFi can get to be a bother. This is when a modest investment (less than \$10) in an Ethernet crossover cable can help speed up the process considerably. This is basically a piece of cable that internally connects one computer's Ethernet TX (Transmission) port to the opposite side's RX (Reception), and vice-versa. It can be used to do away with a network switch, and since there are only two computers on a full-duplex communications link, connection speeds can actually be rather higher than through a switch.

These days, crossover cables are

usually found in red color, though it is best to check it is not actually a straight patch cable (slightly cheaper).

Before connecting the computers, we will need to draw up a strategy for file transfers. Which protocol do we use, and which programs? Since we have already seen the rsync utility in this article, I will continue using it, but this time over a SSH link instead of to a locally-connected external disk.

Setting up an SSH link on Ubuntu systems simply implies installing the openssh-server package on one computer (the client package is already installed by default on both). This can be done from the terminal:

```
$ sudo bash
# aptitude update
# aptitude install openssh-server
```

or it can also be done from within any graphical software management program you prefer: Synaptic, the Ubuntu Software center, Muon, etc.



HOWTO - BACKUP IN UBUNTU

Once installed, the SSH server automatically creates its key pair, and starts up. You can check it is working from the terminal on the same machine it is installed on by issuing:

```
ssh localhost
```

If the terminal requests confirmation to continue connecting, and then asks you for your password, you are in business.

If you prefer to use SSH using a certificate, without having to enter a password each time you connect, you can follow the instructions in this thread on Askubuntu:

<http://askubuntu.com/questions/46930/how-can-i-set-up-password-less-ssh-login>

Once both computers are connected, we will need to configure IP addresses. Since running a DHCP server on one of our machines is probably a bit high on the geek-meter for ordinary users, that leaves two choices open to us:

- manually set an IPv4 address on each computer
- use IPv6 and its autoconfiguration feature

If using IPv4, I suggest you use the 172.16.0.0/16 private network address block, since it seems to be rather less used in domestic routers than the more common 192.168.0.0/16. For example, you could issue on the SSH server:

```
sudo bash
```

```
# ifconfig eth0 172.16.0.1/16
```

and on the other machine

```
sudo bash
```

```
# ifconfig eth0 172.16.0.2/16
```

If this works out well, you can now ping back and forward between the machines. On the server, to ping three times the other computer, issue:

```
ping 172.16.0.2 -c 3
```

You should see several lines starting with "received 64 bytes" and with a time in milliseconds at the end. If you get lines containing

"Destination Host Unreachable", the connection is not working.

On the other hand, IPv6 automatic address configuration has a distinct advantage over IPv4: the same link-local address will always be assigned to the same interface on each machine every time, and without needing any manual configuration. To know which address you have assigned to the eth0 interface, issue

```
ifconfig eth0
```

You should obtain something like that shown below.

Note the IPv6 address on the second line down, beginning with "fe80::".

From the other computer, I can now ping this one using the IPv6 ping6 utility:

```
ping6
```

```
fe80::de0e:a1ff:fe4e:7c86%eth0
```

Please note I left out the /64 netmask, and tacked on the %eth0 interface indicator at the end.

Now, on to doing the actual backup. From the other computer, I can update all my files on the SSH server using either

```
rsync -aruv /home/alan/*  
172.16.0.1:/home/alan/
```

or

```
rsync -aruv /home/alan/*  
[fe80::de0e:a1ff:fe4e:7c86%eth0]:/home/alan
```

IPv6 addresses often need to be placed between '[' keys. In either case, the server should require my password, and then start performing synchronization.

In the other sense, I can synchronize all files from the

```
$ ifconfig eth0  
eth0      Link encap:Ethernet  HWaddr dc:0e:a1:4e:7c:86  
          inet6 addr: fe80::de0e:a1ff:fe4e:7c86/64 Scope:Link  
          UP BROADCAST MULTICAST  MTU:1500  Metric:1  
          RX packets:168 errors:0 dropped:0 overruns:0 frame:0  
          TX packets:354 errors:0 dropped:0 overruns:0 carrier:4  
          collisions:0 txqueuelen:1000  
          RX bytes:24784 (24.7 KB)  TX bytes:53174 (53.1 KB)
```

HOWTO - BACKUP IN UBUNTU

server to the other computer using similar rsync commands:

```
rsync -aruv  
172.16.0.1:/home/alan/*  
/home/alan/
```

or

```
rsync -aruv  
[fe80::de0e:a1ff:fe4e:7c86%eth0]:/home/alan/* /home/alan/
```

To make sure all files are up-to-date on both machines, it may be necessary to perform synchronization in both directions - especially if both computers are occasionally used to work on and modify files. Naturally, this sequence can be automated within a script file, that could, for example, be called backup.sh:

```
#!/bin/bash
```

```
rsync -aruv /home/alan/*  
[fe80::de0e:a1ff:fe4e:7c86%eth0]:/home/alan
```

```
rsync -aruv  
[fe80::de0e:a1ff:fe4e:7c86%eth0]:/home/alan/* /home/alan/
```

The file will need to be made executable with

```
chmod 755 backup.sh
```

before use. It can then executed

with

```
./backup.sh
```

GRAPHICAL FRONTENDS FOR AUTOMATIC BACKUPS

By this point, some readers may be asking themselves if I ever intend to talk about automatic backup apps, such as the Déjà Dup program that now comes installed as standard in Ubuntu.

There are two different points of view regarding this kind of program. Automatic backups can help take a little of the hassle out of making backups: they do the remembering for you, and handle most if not all of the action.

But it can also be argued that this can in fact become a bit of a liability, since depending on automatic actions will, over time, tend to make us less aware of what the computer is actually doing. We will end up not staying on top of our backup volume's level of free space, for example. We may take for granted that such or such files are being regularly backup up, without noticing that in actual fact they are not. Graphical interfaces

to the backup process add an element of abstraction that may make things easier to configure for the novice, but unfortunately also obscure the inner workings of the process - which in turn makes mistakes and subsequent disaster situations all the more probable.

Doing manual backups, on the other hand, obligates us to remain aware of what we are doing. We can also keep visual track of the files as they go over - if anything that is important for us and really should be copied, but it's not copied, we see it on the spot. If something weird comes up in the messages, likewise.

So, while making the backup process as automatic as possible may seem a good idea from the standpoint of hassle reduction

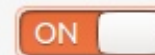
(remember backups must be easy to do, if we want them to actually get done in the real world), perhaps a more balanced approach would be to combine automatic features such as scripts or even graphical applications with a certain level of human control and overview.

In any case, if in any doubt whether to backup or not, please do so - and in as many copies as possible.



Alan teaches computer science at Escola Andorrana de Batxillerat (high-school). He has previously given GNU/Linux courses at the University of Andorra and GNU/Linux systems administration at the Open University of Catalunya (UOC).

Automatic backups



Backup location



deja-dup/alan-Rev-1-0 on Ubuntu One

Folders to back up

Home (alan)

Folders to ignore

Trash, Downloads

Most recent backup

None

Next automatic backup

Today





HOW-TO

Written by Elmer Perry

If you work with Base long enough, you will run into a situation where you need a table structured a little differently, or you'll need the results of a query as a table you can use. The answer to these problems is 'Views'. A view is a query which acts like a table you can use in other queries, forms, or controls. Today, I will show you an example of how this is useful when creating forms.

OUR TABLES

We are going to create a simple database with two tables. The database will track projects for a company and allow us to assign a team member to each project. Below is the structure of the tables we will create.

Project Table

Field|Type|Properties
ID|Integer|Primary Key, Auto Increment
Title|varchar(50)|Not Null
Description|varchar(250)
Due|Date
MemberID|Integer|foreign key

TeamMember Table

Field|Type|Properties
ID|Integer|Primary Key, Auto

Increment
FirstName|Varchar(25)|Not Null
LastName|Varchar(25)|Not Null

Shown right is the SQL to create the tables. Create a new database document, then go to Tools > SQL, and type the commands in by hand or copy and paste.

You can also get the above SQL commands on [pastebin.com](http://pastebin.com/Wyb3R5Fz) at <http://pastebin.com/Wyb3R5Fz>.

The key to our task is the foreign key "MemberID" in the "Project" table, which connects to the "TeamMember" table's "ID" field. When we create our form we will create a drop-down list for selecting the team member who is responsible for the project. Notice that the "TeamMember" table provides first and last name fields. The list control allows us to use only one field in the list. We could display just the last name in the drop-down list, but what if two team members have the same last name. We will solve this problem by creating a view that will combine the first and last name

LibreOffice Pt36: Base Views

```
drop table "Project" if exists;
drop table "TeamMember" if exists;

create table "TeamMember" (
  "ID" integer generated by default as identity
    (start with 1) not null primary key,
  "FirstName" varchar(25) not null,
  "LastName" varchar(25) not null
);

create table "Project" (
  "ID" integer generated by default as identity
    (start with 1) not null primary key,
  "Title" varchar(50) not null,
  "Description" varchar(250),
  "Due" date,
  "Member" integer,
  constraint FK_MEM foreign key ("Member")
    references "TeamMember" ("ID")
);
```

into one field called "Name". We will use our view to populate the drop-down list box.

If the tables do not show in your table list after running the commands, Review > Refresh Table will populate the list.

CREATE QUERY / VIEW

To create our view, we will use a two-step process. First, we create a query, then convert the query into a view. In our query, we combine

the first and last name fields to create one field. We will also get the "ID" field, as we will need it to connect back to the "Project" table.

To create the query, we select the "Queries" option in the "Database" pane. In the "Actions" pane, select "Create Query in SQL View." The follow SQL command will create our query:

```
SELECT "FirstName" || ' ' ||
"LastName" AS "Name",
  "ID" FROM "TeamMember";
```



If you are familiar with SQL, this looks like a standard query except for the double pipe symbols “||”. They are used to concatenate strings together. In the command, we select each “FirstName” and join it to a space, then take the result and join it to “LastName.” Finally, we name this string “Name.” We also get the “ID” as it identifies each record. You can test the query to make sure it works, but at this point your results are blank, but the query should run without error. Save the query as “QueryTeam”.

Turning the query into a view is as simple as right-clicking the query name and selecting “Create as View.” Name the view “TeamView.” If you select “Tables” under the “Database” pane, you will see “TeamView” listed under the tables.

CREATE THE FORMS

We will create a team member form and a project form for data input. The team member form is the easiest, so let's make it first. Click on the “Forms” icon in the “Database” pane and select “Use Wizard to Create Form.” The form

wizard will display.

On the first screen, select “Table: TeamMember” from the drop-down box. Move the “FirstName” and “LastName” fields into the list box labeled “Fields in the form.” Click the “Next >” button. There is no subform so just click “Next >” again. On step 5, use any of the options for arranging the controls except tabular. On step 6, just accept the defaults. With Step 7 pick a style that you like. When you get to step 8, name the form “TeamMemberForm” and leave it on “Work with the form.” When you click the “Finish” button, the form will open for input. Add a few names for testing the project form when we finish it.

For the project form, we need about the same thing, except use “Table: Project” from the drop-down in step 1, and select all the fields except for “ID” for inclusion in the form. Name the form “ProjectForm” and select “Modify the form” on step 8. This time, instead of the form opening for input, it opens for editing.

When you create forms using the form wizard, the wizard groups a text box for most data types with

a label for each field. In order to change the control for the data field, you have to ungroup the text box from the label. In our case, we want to change the “Member” field, so right-click the “Member” label and text box and select Group > Ungroup. Click on the form background to unselect both. Right-click on the text box and select “Delete.” From the forms toolbar, select the list box. If the form toolbar is not showing then View > Toolbars > Form Controls to display it. Once you select the list box, your cursor will become a crosshair, +. Click and drag to create the list drop-down box. When you release the mouse button the list box wizard will pop up.

Select “TeamView” as your table and click “Next >”. The field we want to fill the list box is “Name”, so select “Name” and click “Next >”. Finally, we need to match the fields from the two tables. For the “Value Table” select “Member”. “ID” is the field to select for “List Table” as it is the primary key that matches up with the “Member” foreign key field in the “Project” table.

Save your changes and close the

design window.

Now, if you entered names in “TeamMemberForm”, you can open the “ProjectForm” and those names will appear in the drop-down list box we created. You will want to test creating several projects and assigning members to them to test the workability of your forms.

In this article, we discussed the use of a LibreOffice Base view to create a new table from an existing table. We used this view in the construction of a form that automated the retrieval and selection of records from that view.



Elmer Perry's history of working, and programming, computers involves an Apple][E, adding some Amiga, a generous helping of DOS and Windows, a dash of Unix, and blend well with Linux and Ubuntu. He blogs at <http://eeperry.wordpress.com>



HOW-TO

Written by Tony Hughes

MultiSystem

This is my first tutorial for the magazine, having done a 'My Story' piece a few years ago. As a member of the community, and, for those who don't know me, currently one of the presenters of the Full Circle Podcast, I thought I would pen a few words to help out – given the recent calls for content.

This is a tutorial on how to install and use the free MultiSystem application released under the GPL v3 license, for creating USB sticks containing more than one 'live' ISO image that can be booted from the USB flash drive. This can be useful given that the price of high capacity Flash drives has come down to less than £20 here in the UK. It is not uncommon for people to have at least a 16GB (or greater) stick in hand for creating a USB boot drive. Having a selection of distros and utility disks for system rescue, or just a partitioning disk, can be a useful addition to the Geek's tool box. This tool makes it possible to carry all of these on one USB drive instead of having multiple drives with just one image on each.

First we need to install Multisystem. As this is not currently in the Ubuntu repositories by default, we will need to install the ppa, the instructions for this are found on the MultiSystem web page at:

<http://liveusb.info/dotclear/> The first thing you will notice is that the page is in French as this application has been developed by a French developer; this is not a problem as most web browsers provide translation tools to convert to the language of your choice.



On the right hand side of the page is a series of menus; scroll down to the one titled MultiSystem (free software) and select the

installation page.



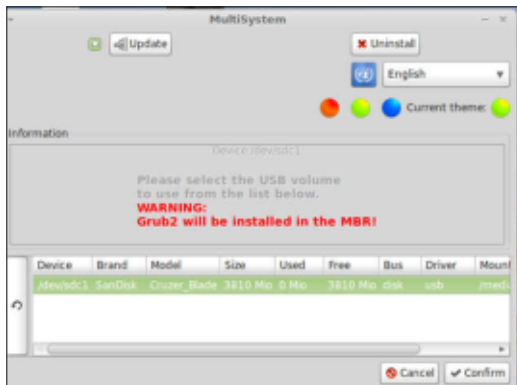
This will direct you to the page that has the instructions for installing the PPA into your package manager. At this stage note that you must go back to the original French by pressing the 'Show Original' in the translation tool bar.



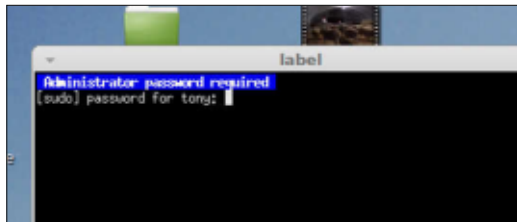
This is because the translation software removes some of the spaces in the commands and if they are not inputted correctly you will get an error message when running them in the terminal; this caught me out the first time I installed the application on to a system. Assuming you've done everything correctly, you should now have MultiSystem installed.

To access the application in Mint or Lubuntu, I navigate to Applications and MultiSystem is in that menu; depending on your version of Ubuntu you may need to search to find it. Before opening the application, select a USB drive where you want to install it, and ensure it is clean and formatted to FAT32; you can use MultiSystem to do this with gparted, or use it as standalone application. If inclined and able, you could use the terminal with fdisk, but whatever you use be careful you format the correct drive.

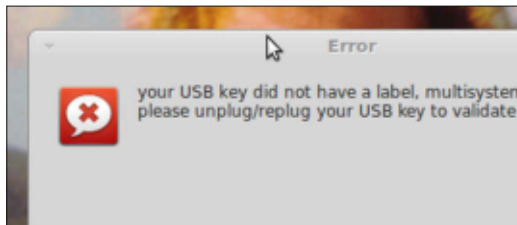
Remount the drive and open MultiSystem and you should see the following screen:



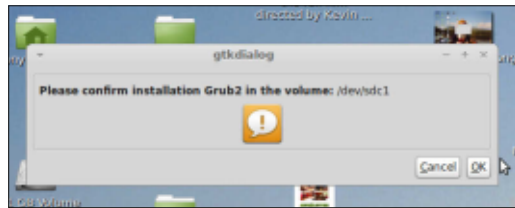
It has correctly identified the USB Flash drive I have on the PC. If you have more than one drive connected to the PC, ensure you select the correct one that you want to use – it will wipe the drive in the following processes. The selected drive is highlighted in green. Press confirm and the following screen will appear:



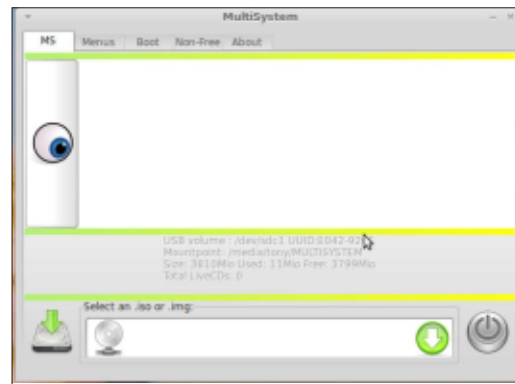
Insert your password and press return and the following screen comes up:



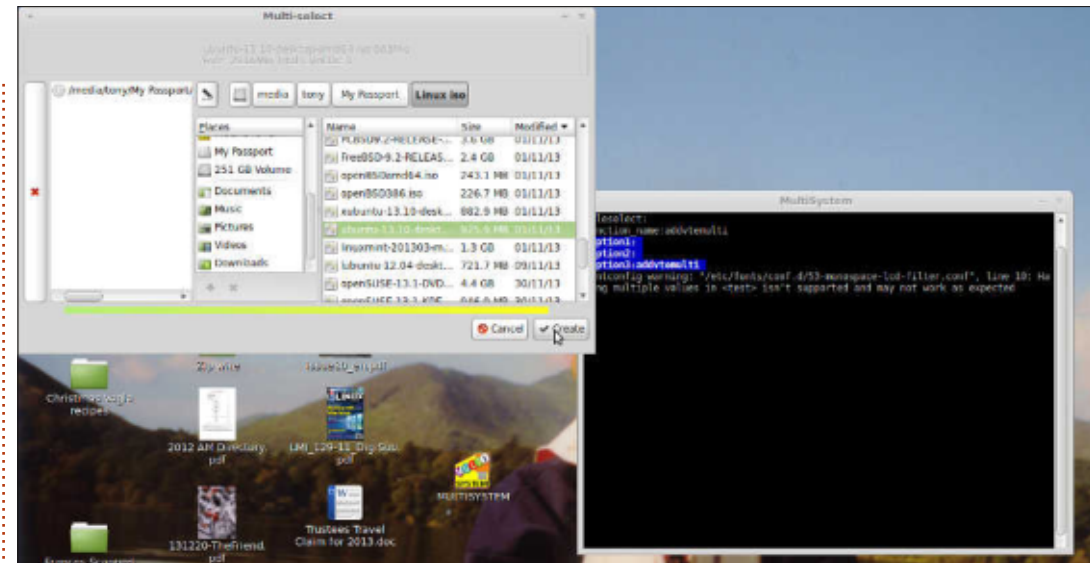
Don't panic; this is just saying that as it is the first time you wish to use the USB drive as a MultiSystem disc it needed to label the drive. Unplug the drive and remount it; now restart MultiSystem, repeat the first step and you should get this screen:



Select OK and this screen will appear:



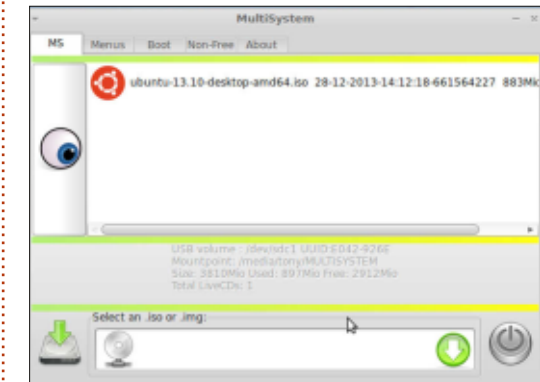
You are now ready to start to install as many live ISO images as the Drive will hold although at this point I should say that not all distros I've installed have worked. I've had problems with OpenSuse despite its supposed support.



To install a live ISO, simply click the arrow and another pop up will appear (shown above)

Search for the ISO you want on your system and double click to add it to the left hand column then click create. Depending on the size of your drive, you can select several ISO's at this stage, but you can add them at a later date if needed. You will be prompted for your password; enter this and the install will begin. This may take some time so depending on the size of the image or images you have picked. Once complete, the install screen will re-appear. At this stage it may seem like nothing has changed; shutdown the application and

restart, you will then see this screen:



To add another ISO at a later date just mount the drive, start up MultiSystem, and you will go to the install screen and you just repeat the process.

To use the Drive as a boot device, install in a USB port on the

HOWTO - MULTISYSTEM

selected PC/Laptop. On startup, select boot from USB drive (on a lot of modern systems the boot menu is accessed by pressing F12 but yours may differ). You should now see this screen.

The number of options you have will vary depending on what you have installed on the drive. You can now select the ISO you wish to boot and you're on your way.

As I have said, this is not a perfect piece of software: even after a reinstall, my desktop Multisystem will no longer label a Drive and I have to start the process out on a laptop I have it installed on. As a tool for creating a multi-booting USB disc, I have

found this invaluable and I now generally carry around a 32GB USB drive with several Linux distros and a number of rescue utilities installed. It comes in handy demonstrating Linux to people at the various events I find myself attending, and at the Blackpool LUG and maker-space where it is used regularly.



Tony is a retired Health worker who has been using PC's for over 20 years. Has been using Linux since 2007 after tiring of the Windows BSOD. Occasional Blog @ <http://tony-hughes.blogspot.co.uk/>



The Ubuntu Podcast covers all the latest news and issues facing Ubuntu Linux users and Free Software fans in general. The show appeals to the newest user and the oldest coder. Our discussions cover the development of Ubuntu but aren't overly technical. We are lucky enough to have some great guests on the show, telling us first hand about the latest exciting developments they are working on, in a way that we can all understand! We also talk about the Ubuntu community and what it gets up to.

The show is presented by members of the UK's Ubuntu Linux community. Because it is covered by the Ubuntu Code of Conduct it is suitable for all.

The show is broadcast live every fortnight on a Tuesday evening (British time) and is available for download the following day.

podcast.ubuntu-uk.org





HOW-TO

Written by Ronnie Tucker

G'MIC InPaint

Nicholas has worked himself into a hospital bed this month, and will be back next month.

One thing that GIMP is well known for is its filters. Think of them as Photoshop plugins. One GIMP filter that is incredibly powerful – yet not so well known, it seems – is G'MIC. Meaning 'GREYC's Magic for Image Computing,' it comes with an incredible amount of filters covering deformations, degradations, details, film emulsion, patterns, rendering, repair, and even a section for filters still in testing. In this quick example, I'll talk about the Inpaint feature. This allows you to mask an area which Inpaint will fix for you.

INSTALLING

Go to:

<http://gmic.sourceforge.net/gimp.shtml> and download the appropriate file (32/64 bit). Unarchive the download to your



GIMP plugin directory (this is usually /home/.gimp2.8/plugin-ins or thereabouts, so you may need to show hidden files to find the .gimp2.8 folder). Now, when you start GIMP and click the 'filters'

menu, you should see G'MIC at the bottom of the list.

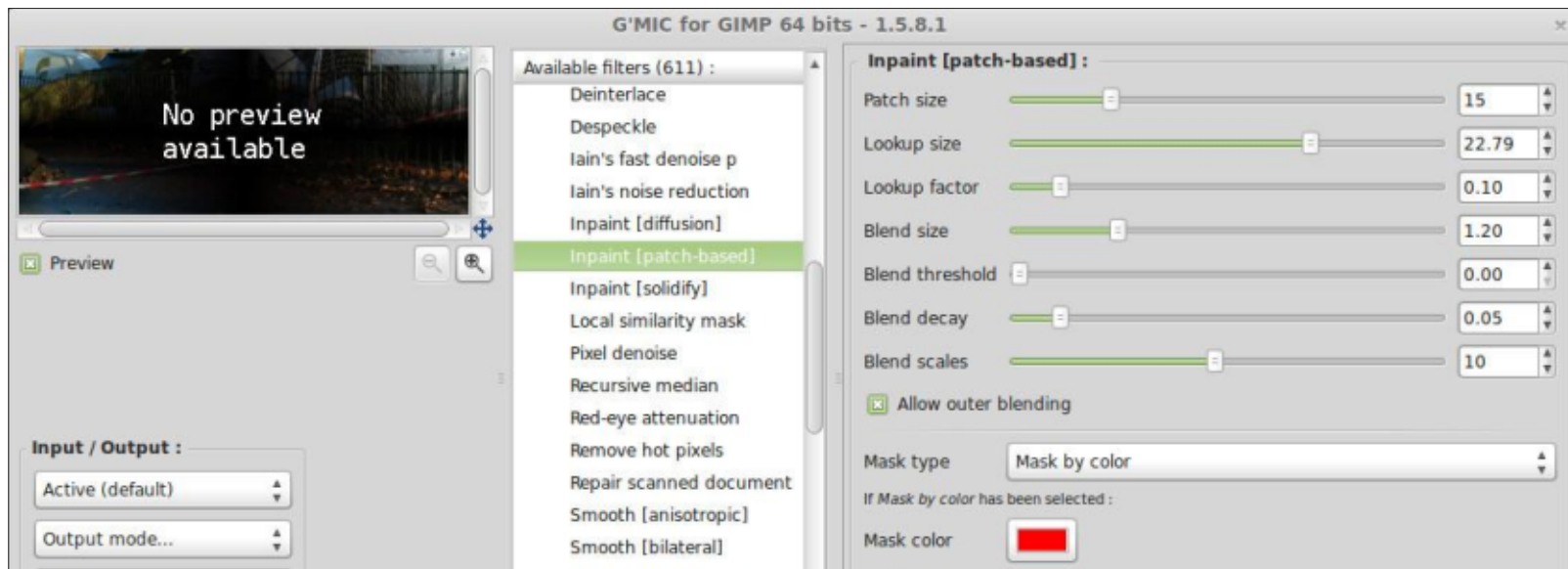
USING

When you have a photo loaded

(in GIMP), you use the pencil tool (not the paintbrush) to cover the parts of the photo you want Inpaint to remove. I started with the photo shown above.



HOWTO - G'MIC INPAINT



I decided to test Inpaint by seeing if it could remove the red and white tape. I simply drew over it with the pencil tool using bright red (pure red, no green or blue) as shown on the previous page

(bottom image).

Next, I opened G'MIC (filters > G'MIC), clicked REPAIR, then 'Inpaint (Patch Based)':

From the default settings I raised the Patch Size setting to 15 and the Lookup Size to 22. After that I clicked OK and waited. It does take a fair bit of computational power to do this, so

now is the time to grab a tea/coffee.

And below left is the final result.

Is it perfect? No. Is it quick and easier than using the cloning tool? Definitely!

I purposely chose this photo as I thought maybe the railings would catch it out, but InPaint worked fine. There are a couple of bits on the railings where it isn't perfect, but I'll let you see if you can spot them.

G'MIC has literally dozens of great filters in it so have a play around with them!



Ronnie is the founder and (still!) editor of Full Circle. He's also a self-taught (part-time) artist who draws both serious and silly things. His work can be seen at: <http://ronnietucker.co.uk>.



HOW-TO

Written by Mark Crutch

Inkscape - Part 23

Previously we looked at using Inkscape's Tweak Tool to change objects and properties. This time we'll take a look at its arguably more useful ability to modify paths. The path tweaks are affected by the Width and Force sliders that were described last time, and are chosen by selecting one of the four buttons that I've outlined with a red box in the tool control bar image shown below.

Because these tweaks modify the nodes in a path, our previous array of objects won't make for a particularly useful example. Instead we need to create a new path or object to work on. There are some rules, though, which practically limit what we will draw as an example path:

- The tweak tool works on only closed paths. If it's used on an open path, it will be turned into a closed one.
- It doesn't work well on straight paths or path segments.
- It doesn't work well on paths with only two nodes, even if those paths

are curved.

- If it's used on an object, such as a circle or rectangle, that object will be converted to a path.

So our example really needs to be a closed, curvy path with more than two nodes. A quick option is to use the Star tool with the Roundness parameter turned up a little to produce a rounded star which will be turned into a path when we start to tweak it.



As usual with the Tweak Tool, you have to select the objects you wish to work on before switching to the tool. You don't, however, have to select the individual nodes

you want to change – they're all fair game for tweaking. Actually, you'll often find that the connected nature of nodes means that changes will be made to the shape of your path that extend far beyond what the Width parameter would imply.

With our rounded star selected, and the "Push" tweak enabled, let's make a couple of steady sweeps of the tool from left to right.



It's pretty clear what has happened: parts of the path have been pushed away from the tool as it moved across the shape. First the left side was pushed into the

middle then, as the tool passed over the boundary of the shape, the right side was pushed further out. Essentially the path is distorted in the direction that the tool is moved, and this tweak actually feels a lot like pushing watercolor paint around on a page by blowing through a drinking straw. The amount of distortion depends not only on the Width and Force parameters, but also on the speed at which you move the tool. If you move it slowly enough you can even cut an object into separate pieces.

At this point it's worth introducing the Fidelity parameter, over on the right of the tool control bar. This controls the number of nodes that are created as you tweak. Manually converting this rounded star to a path results in 10 nodes. The example above had the Fidelity set to 10, and resulted in the final path having 41 nodes. Increasing Fidelity to 50 and re-tweaking the original gave 59 nodes, while a fidelity of 80 gave



over 150 nodes. Increasing the Fidelity to 100 created many thousands of nodes, and slowed my computer down to a crawl. I recommend keeping this value to 50 or below – the accuracy created by the extra nodes is rarely worth the trade-off, in my experience.

The next button on the tool control bar is the Shrink/Grow mode. This doesn't take its directional cue from the movement of the tool, but instead it will always move nodes in towards the center of the path – or outwards, away from the center, if the Shift key is held. This example used Shrink for the top half of the star, and Grow for the bottom half.



The penultimate node tweak is Attract/Repel. In its normal mode, the path is distorted as though it's being attracted towards the center

of the tool; with Shift, the path is instead repelled away from the center of the tool.

This is useful for sculpting the shape of a path. By moving the tool around the outside of the path, you can pull it outwards – making it bigger. Moving it around the inside of the path, on the other hand, pulls it inwards – making it smaller. Holding Shift simply reverses the direction of the pull. Try using this to shave away part of an object, or to make it gently bulge outwards. If you go too far in one direction either hold Shift, or move the cursor from outside the shape to inside, or vice versa.

The final tweak promises so much, but delivers so little. In theory the Roughen tweak should introduce some randomness and chaos into the shape of your path. What actually happens is that the randomness largely cancels itself out, leaving you with a lot of extra nodes that haven't moved very far. The best results seem to come from using a large value for Width in order to smother as much of the path as you can with the tool. Even with both the Width and the Force at their maxima, I was still able to produce only this:



I suppose the Roughen tweak is living up to its name in this case. The path certainly looks rougher in parts. But because the effect is stronger towards the center of the tool, the roughness hasn't been applied evenly around the path. Trying to draw the tool over the outline in an effort to spread the effect just results in it cancelling itself out again, producing a less rough result. To make matters worse, the rough areas now have huge numbers of nodes – this example resulted in our 10 node star growing to almost 2,000 nodes!

If you do want to randomise a path, a better option is usually to be found in the “Jitter Nodes...” extension. This requires a little preparatory work because it just moves nodes and their handles, rather than creating them. You

have to manually create a number of nodes beforehand, otherwise your jittering will be rather ineffective.

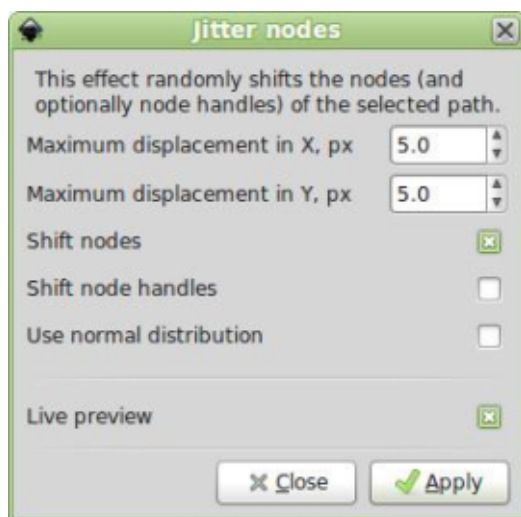
Before we can even think about creating new nodes, we need to ensure that our object is a path. In the case of our example star, it's not. That's not a problem as we've converted plenty of shapes to paths in the past, so it should be a familiar operation by now: just select the object and use Path > Object to Path (Shift-Ctrl-C). Now we've got a star-shaped path made up of 10 nodes, but if we try to jitter those few nodes, all we'll succeed in doing is slightly distorting the shape.

By switching to the Node tool (F2), our 10 nodes become visible. Next we have to select them all by pressing Ctrl-A or using Edit > Select All. Press the Insert key on the keyboard and a new node will be created between each pair of selected nodes. Now we have 20 nodes, which is better, but still not enough. Fortunately the newly created nodes have automatically been added to our selection, so all we have to do is press Insert again, and again, and again. 20 nodes becomes 40, then 80, and so on. I

stopped at 160 because this gave me a fairly dense arrangement of nodes for jittering, without asking Inkscape to deal with excessive numbers.

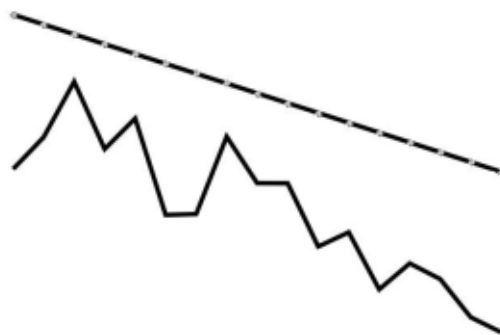


You need to switch back to the Select tool (F1) and ensure your path is selected before launching the Jitter Nodes extension using the menu entry: Extensions >



Modify Path > Jitter Nodes... Once the dialog opens, the first thing to do – and this is the case with many of Inkscape's extensions – is to check the “Live preview” checkbox at the bottom. This will allow you to modify the controls in the dialog and see the results applied to the canvas prior to committing them with the Apply button.

The rest of the controls are fairly simple. The first two spinboxes are used to set the amount that each node or handle can be shifted in the X and Y directions. Usually you would want to set these to the same value, but there are occasions when you want more movement in one direction than the other. For example, creating a line with lots of nodes, then jittering them in only one direction, is a quick and easy way to make a fake line graph.



The next two controls determine whether the positions of the nodes or their handles will be shifted. Shifting the nodes gives a more distorted line; shifting the handles produces more spikes and sharp transitions; choosing both will give you a more distorted line that also has spikes and sharp angles. The last control simply determines how the random shifts are selected. If this is checked they will follow the “bell curve” shape of a normal distribution, meaning that small shifts are more likely than large shifts. In theory this can give a more natural appearance, but in practice the difference isn't really noticeable in many cases.

So what of our rounded star, now that we've converted it to a path, added nodes and jittered it? Well it's certainly different to the result of the Roughen tweak, but



it's probably a lot closer to the result you were looking for.

As I mentioned last time, I rarely make use of the tweak tool. I find it too difficult to control accurately, with the effects often being far too subtle or far too strong. Using a pressure sensitive graphics tablet can certainly help, as it's easier to dynamically modify the Force as you work, but often – as in the case of the Roughen example – you can get better results using other methods.



Mark's Inkscape created webcomic, 'Monsters, Inked' is now available to buy as a book from <http://www.peppertop.com/shop/>



HOW-TO

Written by Ronnie Tucker

Write For Full Circle Magazine

GUIDELINES

The single rule for an article is that **it must somehow be linked to Ubuntu or one of the many derivatives of Ubuntu (Kubuntu, Xubuntu, Lubuntu, etc).**

RULES

• There is no word limit for articles, but be advised that long articles may be split across several issues.

• For advice, please refer to the **Official Full Circle Style Guide:**
<http://url.fullcirclemagazine.org/75d471>

• Write your article in whichever software you choose, I would recommend LibreOffice, but most importantly - **PLEASE SPELL AND GRAMMAR CHECK IT!**

• In your article, please indicate where you would like a particular image to be placed by indicating the image name in a new paragraph or by embedding the image in the ODT (Open Office)

document.

• Images should be JPG, no wider than 800 pixels, and use low compression.

• Do not use tables or any type of **bold** or *italic* formatting.

If you are writing a review, please follow these guidelines :

When you are ready to submit your article please email it to:
articles@fullcirclemagazine.org

TRANSLATIONS

If you would like to translate Full Circle into your native language please send an email to ronnie@fullcirclemagazine.org and we will either put you in touch with an existing team, or give you access to the raw text to translate from. With a completed PDF, you will be able to upload your file to the main Full Circle site.

REVIEWS

GAMES/APPLICATIONS

When reviewing games/applications please state clearly:

- title of the game
- who makes the game
- is it free, or a paid download?
- where to get it from (give download/homepage URL)
- is it Linux native, or did you use Wine?
- your marks out of five
- a summary with positive and negative points

HARDWARE

When reviewing hardware please state clearly:

- make and model of the hardware
- what category would you put this hardware into?
- any glitches that you may have had while using the hardware?
- easy to get the hardware working in Linux?
- did you have to use Windows drivers?
- marks out of five
- a summary with positive and negative points

You don't need to be an expert to write an article - write about the games, applications and hardware that you use every day.





Online
BACKUP

Secure
SYNC

Easy
SHARING

Whether you need to access a document you have stored on a remote server, synchronize data between a Mac, Windows or Linux device, share important business documents with your clients, or just rest easy knowing all of your data is safely, securely, and automatically backed up - SpiderOak's free online backup, online sync and online sharing solution can handle all your needs!

SpiderOak offers a different approach to online backup by combining a suite of services into one consolidated tool - free online backup, synchronization, sharing, remote access, and storage. This difference is further measured in our zero-knowledge privacy policy - the first one ever employed in this setting. Our flexible design allows you to handle data from any operating system (Mac, Windows and Linux) or location (external drives, network volumes, USB keys, etc...) using just one centralized account.

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- ➔ Configurable multi-platform synchronization
- ➔ Preserve all historical versions & deleted files
- ➔ Share folders instantly in web ShareRooms w / RSS
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- ➔ Comprehensive 'zero-knowledge' data encryption
- ➔ 2 GBs Free / \$10 per 100 GBs / Unlimited devices

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ASK THE NEW GUY

Written by Copil Yáñez

Hi, everyone! Welcome back to Ask the New Guy!

If you have a simple question, contact me at copil.yanez@gmail.com.

Today's question is:

Q: I want a personal website. Can Ubuntu help me build one?

A: Fancy a website, do you? Well, aren't you cutting edge. Listen, I don't mean to tell you your business, but if you're only now getting around to thinking about a website, it's possible you've missed a few other technological advances you should know about. Like the wheel. And fire. Toothpaste is nice.

I'm just messing with you. Actually, a personal website, one that you own and control, one that includes only the information you want to put into the world, is a pretty good idea these days. Most of us have allowed Facebook to take over the narrative of our lives. Facebook has essentially replaced my scrapbooking grandmother,

Mama-Nana. Mama-Nana would take old pictures, news clippings, awards and ribbons, and create a proud scrapbook showing off each of her grandkids in embarrassing, but largely laudatory, terms. The scrapbooks were kept in the same cabinet where she hid her bottle of Jose Cuervo 1800 Collección. No one but Mama-Nana was allowed to touch the bottle or the scrapbooks. If you were family, you could put in a request to see one. If you were dating one of us, you had to have visited at least four times, and convinced her you weren't just after her Cuervo. Once you reached this milestone, you got ten minutes in a room with Mama-Nana, the scrapbook of your choice, and a liberal shot of tequila. This meant two things. One, you weren't likely to remember the baby fat pictures I thought I'd destroyed, but Mama-Nana somehow rescued from the fireplace. Two, no one, and I mean NO ONE, who wasn't supposed to see those scrapbooks got to see them.

In modern security parlance, this is what we call an "air-gap." Good

luck trying to hack Mama-Nana.

But today, just about anyone you went to high school with can watch something called "A Look Back." This is Facebook's version of Mama-Nana's scrapbook. It highlights key moments from your life as chosen by a computer algorithm designed by Mark Zuckerberg. Let that sink in. Here, have some Cuervo while it does.

Maybe, just maybe, you don't want people to see you puking into a urinal during Spring Break 1997, set to a score by Yani. Or maybe you do. Either way, having your own website allows you to choose.

Creating your own website is very simple. There are plenty of sites that allow you to create a professional-looking site with minimal fuss. Google, Yahoo and Microsoft all offer all-in-one options that make creating a site a simple matter of point and click.

For our purposes, however, we're going to get a tiny bit more complicated. Don't panic, this is

New Guy, remember? If it takes me longer than a few minutes to do something, I'm already on to the new thing because life is short and Mama-Nana's Cuervo isn't going to drink itself. But getting your hands a little messy with HTML and FTP is not unlike learning to work at the command line: it can be as simple or complex as you want it to be.

Okay, let's set up a website. We'll get to the Ubuntu part soon, but first you'll need a Domain Name. That's the part that goes between www and .com (or .org, or .xxx if that's how you roll). A Google search will turn up hundreds of services that will sell you a domain name. My suggestion is that you choose a company that also has some kind of hosting service. When someone types your domain name into her browser, the host is the company that serves up whatever web pages you've designed. Having the host and the domain name with the same company can make the process of setting up your page a little easier.

Many companies offer a



package deal: free domain name registration and super cheap hosting all in one. The domain name will cost you less than \$10 for the year, while hosting will run that same amount (or less) each month. You'll find many places cost a lot less, but be sure that the tech support and community forums offered by the cheaper host match your level of tech literacy. Paying a bit more to have lots of good support available at any time of the day or night is a good idea. I use Dreamhost (who just happen to host the FCM website) and have been pretty happy with them.

Once you've chosen your domain name (like www.hotubuntuuser.com or something), you'll be asked for your credit card or bank information. This is where you'll be able to add hosting to your package. Remember, no one will be able to see your page until it's hosted somewhere.

Once you've paid, your website name needs to be linked to your hosting service. If you did this all in one place, it may already be set up for you. If not, head to your "panel." This is a browser-based window where you can see which

domains you own, upload HTML files, check payments, configure users, or add additional services. The welcome email you got from your host should include information about how to get to your web panel.

The panel might look complicated at first, but it's essentially the website equivalent of your online bank account. Sure, your bank offers international bank transfers with fees pegged to LIBOR +1, but if you're never going to use that option, you can ignore it. Just focus on the pieces you need for now.

Under your panel's Domain Management section, there should be a way to connect your domain name to the hosting service you've paid for. You'll also configure a user (that's you), with authority to make changes to your site. Logging into your panel is the first step to making changes to your site, configuring a new user is the second. Think of it as your own Mama-Nana, keeping access to your high school prom pictures under lock and key.

On-screen prompts should help you get your domain connected to

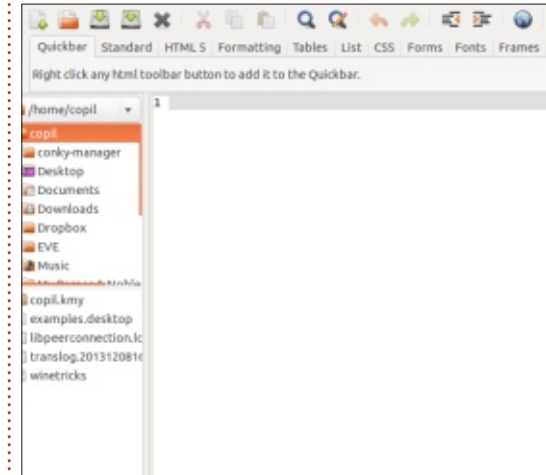
your hosting supplier. Once that's done, you're ready to add whatever you want to your website. Pictures of the family. Your anti-aardvark manifesto. Recordings of ABBA covers you made in the basement. Whatever.

To do that, however, you need some HTML. What does that stand for? Dunno. Honestly, this stuff is all just magic to me. The important thing to remember is that HTML is the code that generates your webpage. Do you need to know HTML? Nope. Sure, it helps, and with time you might want to dig a little deeper. But for now, we can get most of what we need online for free.

Let's play around with the simplest of HTML to create a very, very basic page. How do you generate even simple HTML? You need an HTML editor. An HTML editor is to HTML what LibreOffice Writer is to a text document. It allows you to write the code that the host can then serve to the people who visit your site.

Since this is an Ubuntu magazine, let's see if the open source community can help. Spoiler Alert: Duh!

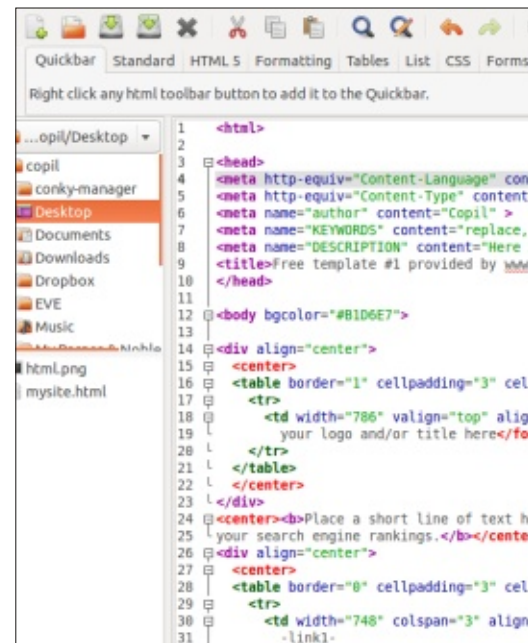
I downloaded a program called Bluefish Editor. It's free, has lots of good reviews, and its available at the Ubuntu Software Center. Once you've downloaded it, fire up that bad boy. You'll be greeted with a blank page that looks like this:



But wait, you're saying. I don't know any HTML, that blank page is staring back at me like a hungry tiger. How do I feed it?

I went online and looked for some very simple HTML I could use that was, crucially, free. I found some here, <http://free-templates.org/template1.html>. Click on that link, select all the HTML in the window that comes up, and then paste it into the blank page on your HTML editor.

The end result looks something like this:



How amazing do you feel?! If you didn't answer "Totally!" then you have a life and, seriously, we can't be friends.

Do a Save As and name your file index.html. Make sure you remember where you saved this file, we'll need it later.

The next step is to figure out a way to get this simple code onto the server hosting your webpage. Head back to your panel and look for something called FTP.

FTP stands for, well, I don't

know, you should quit asking me these questions because I hate disappointing you. You can make an acrostic using FTP and HTML, is that significant? I bet that's significant. Or maybe not.

What really matters is that FTP is a way of transferring files from your computer to the servers where your website is hosted. I'd bet even money the 'T' stands for Transfer, but don't quote me on that.

If you see WebFTP, it means your host has a web-based FTP program, you can upload your index.html file right from the

browser. If not, you can use an FTP program on your desktop that connects to your host and allows you to upload files. As with most programs, Ubuntu offers a free, stable, and robust version. I downloaded Filezilla because it had lots of good reviews, but mostly because I like Japanese monster movies.

Open Filezilla and you'll see something like the image shown below.

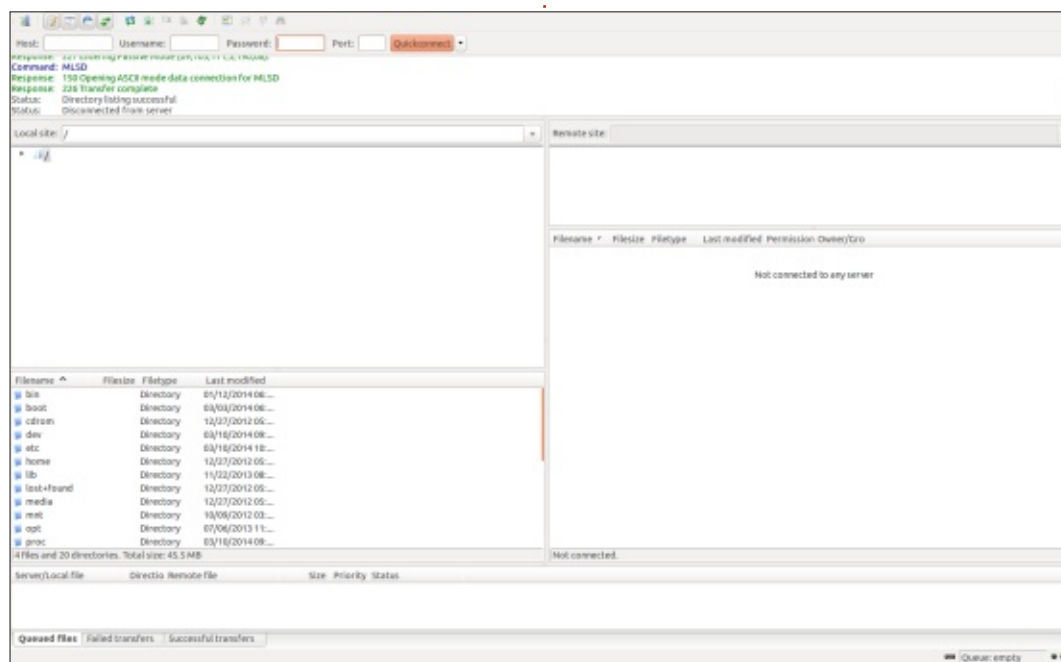
Again, it looks more complicated than it is. On the left hand side is the file tree for your local machine. This is how you'll

navigate to wherever you saved your index.html file.

On the right hand side, it says Remote Site. You've probably already guessed that's our server page, where your website pages are stored. Once you log in, you'll be able to transfer files from the left side of your screen to the right side. Let's log in.

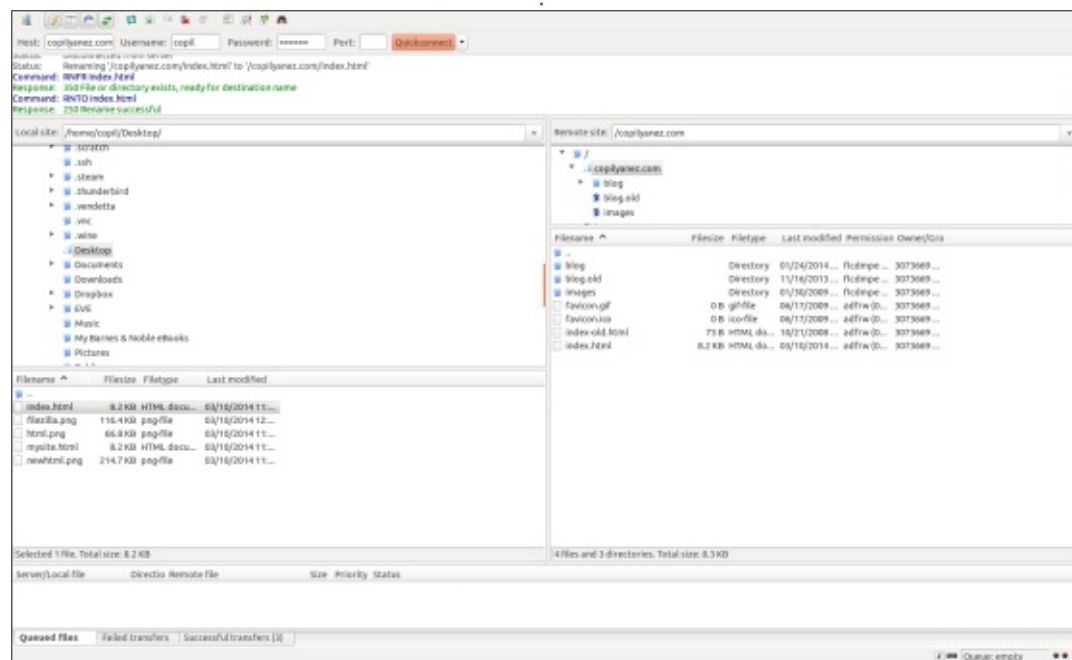
Look along the top of the page and you'll see Host, Username, and Password. The Host is the website domain name you bought. The Username and Password were set up when you configured a user. Fill in those blanks and click Quickconnect.

You'll see some information appear under Remote Site. Click on the right caret and select your domain name from the list that appears. The window just below the Remote Site pane will show the files that make up your website. There may or may not be an index.html page already. On most servers, the index.html file is the main page for a website. The server software knows to look at this file first and present it whenever someone enters your site's URL.

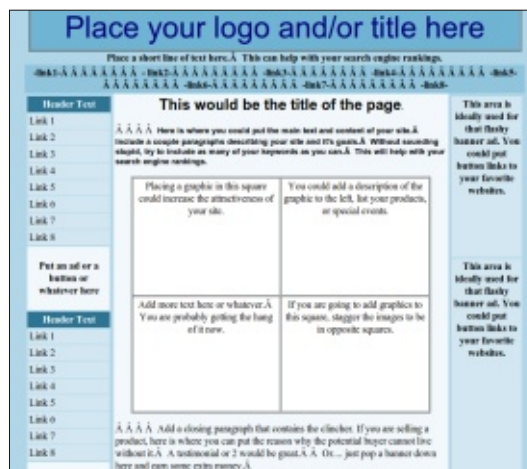


If there's already an index.html file, you can overwrite it. Or you could download it and replace whatever is there with the HTML we copied earlier. Or you can right-click on it and edit it on-screen. Whichever you choose, I suggest renaming any index.html file that was there before to something like index-old.html so that if anything goes wrong, you can restore the original page.

I've chosen to navigate to my desktop (using the left hand pane), locate my saved index.html, and then dragged and dropped that file into the large pane on the right. Like this:



Believe it or not, you did it! If you now go into your browser and point it to your webpage, you should see a new page that looks like the one generated by the HTML we saved in that index.html file!



I know it doesn't look pretty just yet. But if you go in and play around in your index.html file, you can make changes that will affect what you see when you go to your website. I know I said you could add photos and stuff, and maybe we'll address those in a future installment. My goal for now is just to show you how simple it is, using free and powerful programs in Ubuntu, to create and manage your own webpage.

The best part? From your control panel, you can toggle your own Mama-Nana, and require a login and password for anyone who wants to view your page. On the Dreamhost control panel, you navigate to "Goodies" (which makes it seem so tawdry), and select Htaccess/WebDAV. From there, you can make the whole site, or just certain pages within it, secure from Mark Zuckerberg, that creepy guy who had a crush on you in 10th grade, or prospective employers who do NOT need to know about your obsession with eighties hair bands like Poison, Warrant and Quiet Riot.

Remember, you can't really break anything. It's not like if you

make a mistake, everyone in France will lose their Internet connection. Even if you bork something and suddenly your page won't load, you can always reset your site to the earlier index.html file or wipe the whole site clean (there is usually an option in your panel that allows you to do this). And most hosts have forums where beginners can ask questions. Decide what you want to do and then ask how to do it. Simple as that.

I'd like to think that if Mama-Nana were around today, she'd be a website admin, uploading our most cherished (and embarrassing) family moments, and protecting them behind a login screen.

Good luck, and happy Ubuntuing!



Copil is an Aztec name that roughly translates to "you need my heart for what again?" His love of women's shoes is chronicled at yaconfidential.blogspot.com. You can also watch him embarrass himself on Twitter (@copil).



As a Linux user, chances are you've been asked by friends and family to repair their computer. If you've considered or started a business repairing systems, one of your challenges is repair management and customer relationships. PC Repair Tracker, PCRT, is a PHP-based computer repair tracking system. As the name implies, it's tailored more to the PC market. (aside: The PC moniker always annoyed me because PC is any Personal Computer, including Apple systems. But for the purpose of this article, we'll go with the standard of using it to mean IBM-compatible systems).

PCRT is web based, so accessing it from just about anywhere is easy because you can just use your tablet, notebook, or a system you have stored elsewhere in your shop. At our computer recycling project, we have 8 workstations (Xubuntu systems) on KVM switches (Keyboard Video Mouse), so we can switch between the workstation and the computer we're repairing.

PCRT consists of 2 modules, a repair module for tracking computer repairs and a sales module for adding parts to inventory. PCRT is quite comprehensive, tracking a lot of

information about clients and their equipment. For example: when checking in a new repair, you're asked the standard client name, phone, and address information, but also additional contact information (cellphone/work/email/SMS), the preferred contact method, the priority of the repair, the asset/device/model number, when the repair is scheduled for, what other accessories were included (keyboard, mouse, cables, display, etc), any passwords they might have, commonly experienced problems (viruses, noisy fans, screen replacement), where the client found your shop, and their

computer information (CPU, RAM, Hard Drive, Operating System). There's even a spot for their Windows product key.

When you check in a repair, you can assign that repair to any technicians you've entered into PCRT. Technicians are assigned on the Repair > Settings > Manage Users screen. One annoyance is that PCRT displays passwords in plain text and doesn't require the admin to enter the password twice, but this just means you do it without anyone around and it's a very minor annoyance. I checked the mysql tables and the password is hashed in the table. If you enter

REPAIR

New Check-In

Customer Name: James Blonde

Company: Blonde Auto Parts & Experts

Customer Phone: 1-226-337-7274

Customer Mobile Phone: 1-800-337-7274

Customer Work Phone: 1-800-337-7274

Preferred Contact Method: ☐ None ☐ Home Phone ☐ Mobile Phone ☒ Work Phone ☐ SMS ☐ Email

Priority: ☒ Not Set ☐ High Priority ☐ Medium Priority ☐ Low Priority

Asset/Device Make/Model:

Asset/Device Type:

Scheduled Job?: ☒ No ☐ Yes

Scheduled Date/Time: 7/11/14 10:00 AM

Notes:

Power Cord External HD or CD Printer Mouse

Return Print Asset Label Photo Deposit

Repair Claim Ticket

Customer Name: James Blonde
Company: Blonde Auto Parts & Experts
Asset/Device ID: 102
Work Order ID Number: 1002
Processor: Core i3-2330M
Memory (RAM): 4GB
Hard Drive: 500GB
Operating System: Windows XP Home

Check In Date: March 8, 2014, 10:00 am
Customer Assets: Power Cord
Customer Phone: 1-226-337-7274
Customer Mobile Phone: 1-800-337-7274
Customer Work Phone: 1-800-337-7274
Email: james.blonde@blondeautoparts.co

Problem as Described by Customer:
Computer won't power on

PC Repair Tracker

QR-Repair.com

Phone: 1-226-337-7274

Check your work status... Scan with your smartphone

an email address for your technicians, you can notify them by email when you check in a new repair. Once you've checked in a system, PCRT opens up a browser window to print out a repair claim ticket. This is where PCRT gets really cool. On the repair claim ticket is a QR code which client's can use to check the status of their repair if you're using PCRT on a web site. (We use PCRT on our Intranet, not the Internet, so we don't use this functionality).

At this point you can also take photos of the equipment using a webcam or upload photographs and screenshots you've taken through other methods. This comes in really handy in a busy shop where equipment doesn't always arrive in the best condition.

It's also handy for showing physical faults the client might not be aware of.

PCRT assigns an asset/device ID# and a work order number. To mark devices which are associated with the work order, you can print out asset labels using a Dymo label printer. Other printers are not supported. We get around this by taking the client's printer repair claim ticket to our Zebra printer workstation where we scan in the regular barcode, which is the work order ID. We then print out multiple work order IDs on our Zebra barcode printer for each asset we're checking in.

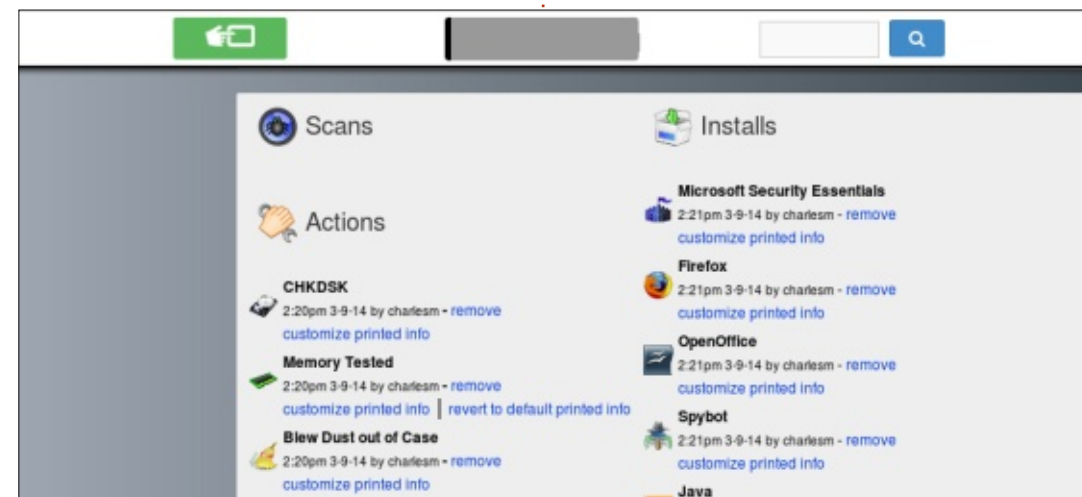
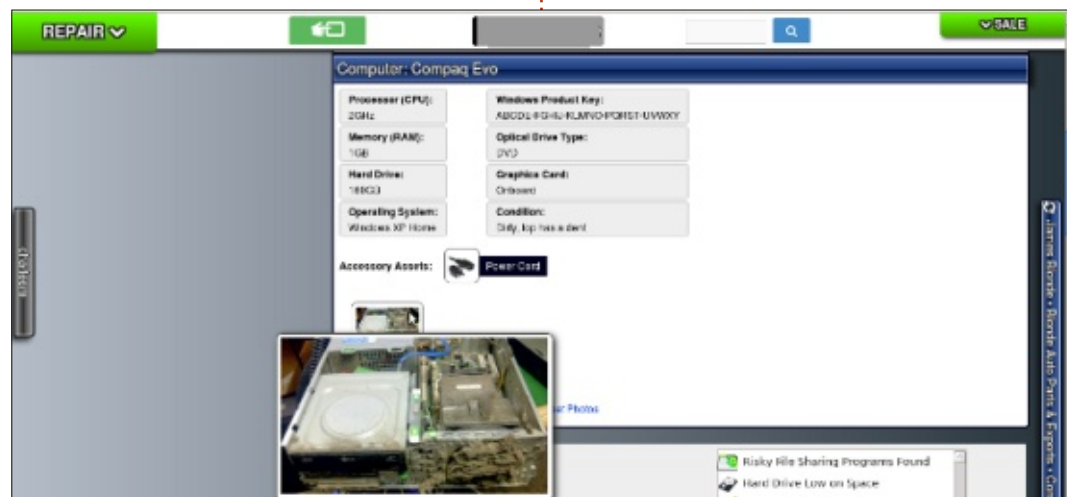
Repairs normally sit on the "Waiting for Bench" screen until a technician changes the status to

"On the bench." Next, assign the bench you're working on from 1 of 4 benches (default, but you can change this). The administrator can assign different benches in the Repair > Settings screen. If you missed printing the claim ticket, you can print it again on the work order screen. The work order screen is where technicians document the actions they take to repair the machine.

Repair reports, thank you letters, price cards, checkout receipts, asset and address labels can also be printed or emailed to the client. Sometimes we have a repair that starts as a low priority but ends up becoming more urgent; priority can also be changed on the work order screen. Although clients can check on the

status of their work order (if you have PCRT on the Internet) you often have to communicate with them about your findings (bad sectors on the hard drive, faulty stick of RAM, dust clogging up the CPU heatsink, bad DVD-RW, etc.). Beside the Priority drop-down is a Call/Contact status drop-down where you can choose from one of: Not Called, Called, Sent SMS, Sent Email, No Answer, or Awaiting Call Back. PCRT also keeps a history of this beside the call/contact status so you can check back on previous communications.

Below the client and work order information is the computer information section that contains details like CPU, RAM, Hard Drive size, Operating System, Windows Product Key, any accessories, and



any asset photographs. Asset photographs can be uploaded from pictures previously taken or from an active webcam. Asset photographs can also be deleted. It's worth noting that when you print a repair report, it's also possible to print a report with all asset photographs. By default PCRT only prints the highlighted photograph. The highlighted photograph is the main photograph for the item. If you leave PCRT sitting on the work order screen for a while, it switches to the repair touch screen which lists all the orders currently on the bench.

Most of the actions you perform on a repair are below the computer information section. This section is divided into 4 sub-sections: Scans, Actions, Installs, and Notes. PCRT comes stocked with a bunch of default scans, actions, installs and notes. As of PCRT v 1.38, Scans consists of 15 different anti-malware/registry programs, 12 different actions, 5 different installs, and 11 different notes. But if the scan, action, install or note you want to perform is not listed, PCRT has a section to add a custom scan, action, install or note.

The most recent version of PCRT has added a new section below the Scans, Actions, Installs and Notes section where you can add a timed task. Below the timed task section are a couple of notes sections, one for notes for the customer, the other for technician-only notes. Technician-only notes come in really handy when you want to add a note for another technician that shouldn't appear on the report for the client.

The Scans, Actions, Installs and Notes you add appear in the next section. When you add a Scan you normally enter the amount of infections found. That number appears in this section along with the program used. Actions, Installs, and Notes all have information associated with them that gets printed for the client. You can customize the message that appears for the client. For example, the Memory Tested information default message is "The memory or RAM in your computer was tested with a very extensive test to make sure it is free from defect. Bad memory can cause random crashes. Your computer passed these tests." You could remove the last part and add information about bad RAM.

The last section on the work order can be used to enter billing information. When you add a billing information item, charges appear just below the computer info section. Once you've added up all the billing items, you can create an invoice for the client. PCRT has a quick-items section on the side for items you commonly bill for. By default PCRT comes with Virus/Spyware Removal, OS Reload, Data Backup, Minimum Bench Fee, Tune Up Bench Fee, Component Install and Install CD-ROM.

I've only covered a tiny portion of PCRT for this article. PCRT supports d7 integration, client email service reminders (for tune-ups, etc.), several payment plugins, customer source tracking for marketing, inventory management, sales and technician reporting, multiple tax rates, and the list continues to grow as PCRT grows.

PCRT is written in PHP, but it isn't free (as in beer). At the time of writing, PCRT costs \$200 U.S.D. This price includes a year of updates after which there is a \$125/year renewal fee. Our refurbishing project bought PCRT

just shy of a year ago. Since then there have been two major updates (from 1.36 to 1.37 and 1.38) and about 9 point updates. PCRT is actively updated and continues to add new features. For us it's been well worth the money even though we barely use a fraction of the features.



Charles McColm is the author of *Instant XBMC*, and the project manager of a not-for-profit computer reuse project. When not building PCs, removing malware, encouraging people to use Linux, and hosting local Ubuntu hours, Charles blogs at <http://www.charlesmccolm.com/>.



I was intrigued by the section “Ask the new guy” in FCM#80: a comparison between personal finance tools with the goal of implementing a simple personal check book.

At that time I was testing LXLE Linux, which, as other light distros do, brings up HomeBank.

I did a fast web search and I found some interesting pieces of information: HomeBank is a long story package, it is fully translated to some languages, it is available for Windows, there is an unofficial release for OS X and we find it in the official repos of most Linux distros.

Furthermore, HomeBank's guiding principle is to have easy money income and expense tracking.

On first run, we're presented with the choice of reading the

manual, setting preferences, create a new file or open an existing one or opening the example file; this greeting window, shown automatically only once at first run, is always accessible by the Help menu.

My first action was unlucky: I tried to open the example file and I discovered it was not installed, and even worse, there was no `/usr/share/homebank/datas/` directory where I should find a bunch of pre-configured categories in various languages; I solved the issue by grabbing the missing directory and its content from another distro I'm double booting.

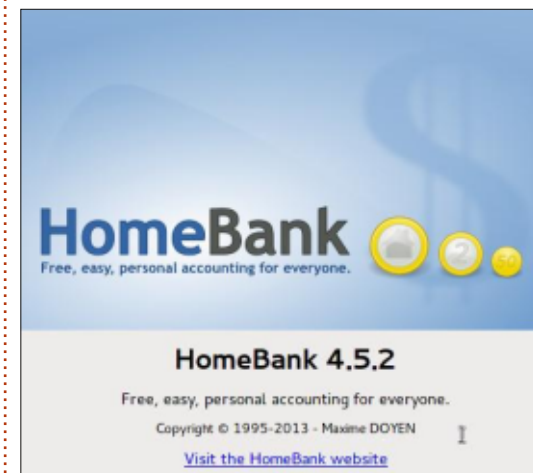
The sample shows an accounting situation with two accounts and chart, giving us a clue of what we can do with our simple accounting system: very attractive and useful for those of us, like me, who are comfortable with learning by examples.

My second step was reading the user manual here and there: it is easy indeed, and the target audience is a common user – accounting specialists' terms are not there.

After these two steps I was ready to start my ledger: HomeBank is based on accounts, payees and transactions.

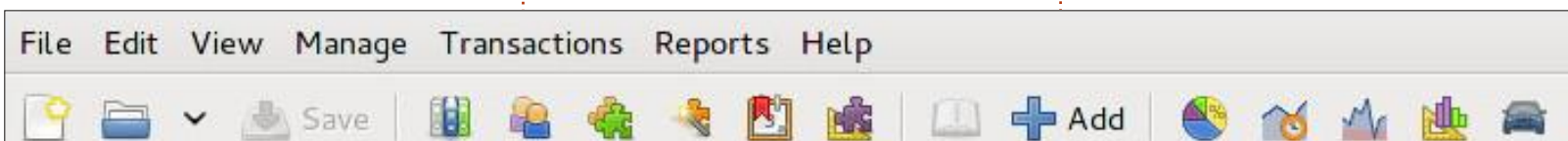
The main window allows us access to all the functions in an intuitive way: menus and icons guide us easily through our accounting tasks.

We find a three-level accounting hierarchy: wallet – account – transaction, where the first is the total amount of financial records we want to keep controlled – and it corresponds to the file where the information is stored, the second is a balance grouping subdivision for more than one bank account, credit cards statement, cash expenses



tracking and so on; the third, the transaction level, is the atomic money movement we make.

I decided to set up three accounts: bank, credit card, cash. I've my money on a bank account, from which, periodically, the bank takes off the money to cover the expenses I incur with the credit card, and I withdraw cash and use it in some payments. Having three accounts, I can reconcile the bank statements with the HomeBank bank account, the credit card statement with the HomeBank credit card account, and the bills I pay by cash with the HomeBank cash account. By the way, while defining our bank account, we can



REVIEW - HOMEBANK

set up two checkbook counters, and they will automatically increase every time we register a check payment.

When the bank takes the amount for covering credit card expenses, I move it from the bank account to the credit card account; when I withdraw cash I move it from the bank account to the cash account; when I pay by cash I register transactions on cash account – these actions can be done by the internal transfer transaction type.

We can define a list of payees – persons or entities giving to us or we giving to them money – in order to speed up transaction recording

and to ease filtering, sorting and checking. At first I did not enter a payees list, but after a while I found it useful, and I fixed the payees for the transactions I had already recorded.

Each transaction has a type of payment, which activates a specific action: an internal transfer brings us a field for a destination account inside the current wallet; a check payment brings us an option to mark the second checkpad. Each transaction has also a payee, in other words who is receiving money from us or is giving money to us.

We can classify our transactions in categories, and split every single

transaction into sub-categories, e.g. in a store you buy food and sports-wear and pay by debit card: you want to keep their expenses checked separately, but you have only one row on your bank statement; I found the category splitting supplied by HomeBank well fitting my requirements. Categories are used in charting and reporting features: a good category classification brings meaningful reports and charts.

Adding a new transaction is very easy: you can add it once you have chosen the account, copy a transaction and modify it by the handy Inherit function, or create one from a template. A transaction can be marked for reminding, and a

special icon will show up on the transaction status.

There's also a transactions auto-fulfill batch tool that applies to transactions in the same account a template according to words it parses in the memo field of the transactions: it is named "auto assignment", and it is available from the transaction view.

We find a very powerful filtering function in the account details: it filters by including or excluding many characteristics of transactions: date, status, pay mode, text, category, payee.

There is a specific utility for managing car expenses: simply

Add transaction

Date: 02/12/14 Payee: My Company

Amount: 2400.00 +/- S Category: Wage & Salary:Net Pay

Payment: Deposit Memo:

Tags:

Info:

Account: MyBank

☐ Reconciled ☐ Remind

Fill in with a template

Close Add

Edit Filter

Date

Filter Status

Status Option: Include

Paymode ☐ reconciled

Amount ☒ remind

Text Force: ☐ display 'Added'

Category ☐ display 'Edited'

Payee

REVIEW - HOMEBANK

register all these expenses under a specific category (e.g. MyCar), and if it is a fuel expense in the memo field, put "v=" followed by the volume you bought and "d=" and the distance you made; a special option in the report section will summarize for us fuel consumption and other car expenses.

We find a budget utility: this allows us to set-up a category monthly budget for one year and compare it with the actual expenses.

Repetitive incomes (like a wage), or expenses (like some utility bills or re-payments of a loan) can be easily scheduled via the scheduler.

Reconciling statements with our HomeBank accounts is easy: we open the account, we check and correct, and then we select the transactions we are reconciling and then we use the button "reconcile".

In HomeBank the time is sliced in three parts: bank, i.e. the opening balance plus the reconciled transactions; today (incorporating the non-reconciled transactions), and future (covering the total amount of incomes and

expenses scheduled in the future).

I did not test import and export of data. The features available from the File menu are: import of QIF, OFX/QFX, and specific CSV formatted files; and export in QIF only format. It is also possible to export in CSV format some data like transactions from the accounts detailed view – this feature could be useful for transferring transactions to a spreadsheet.

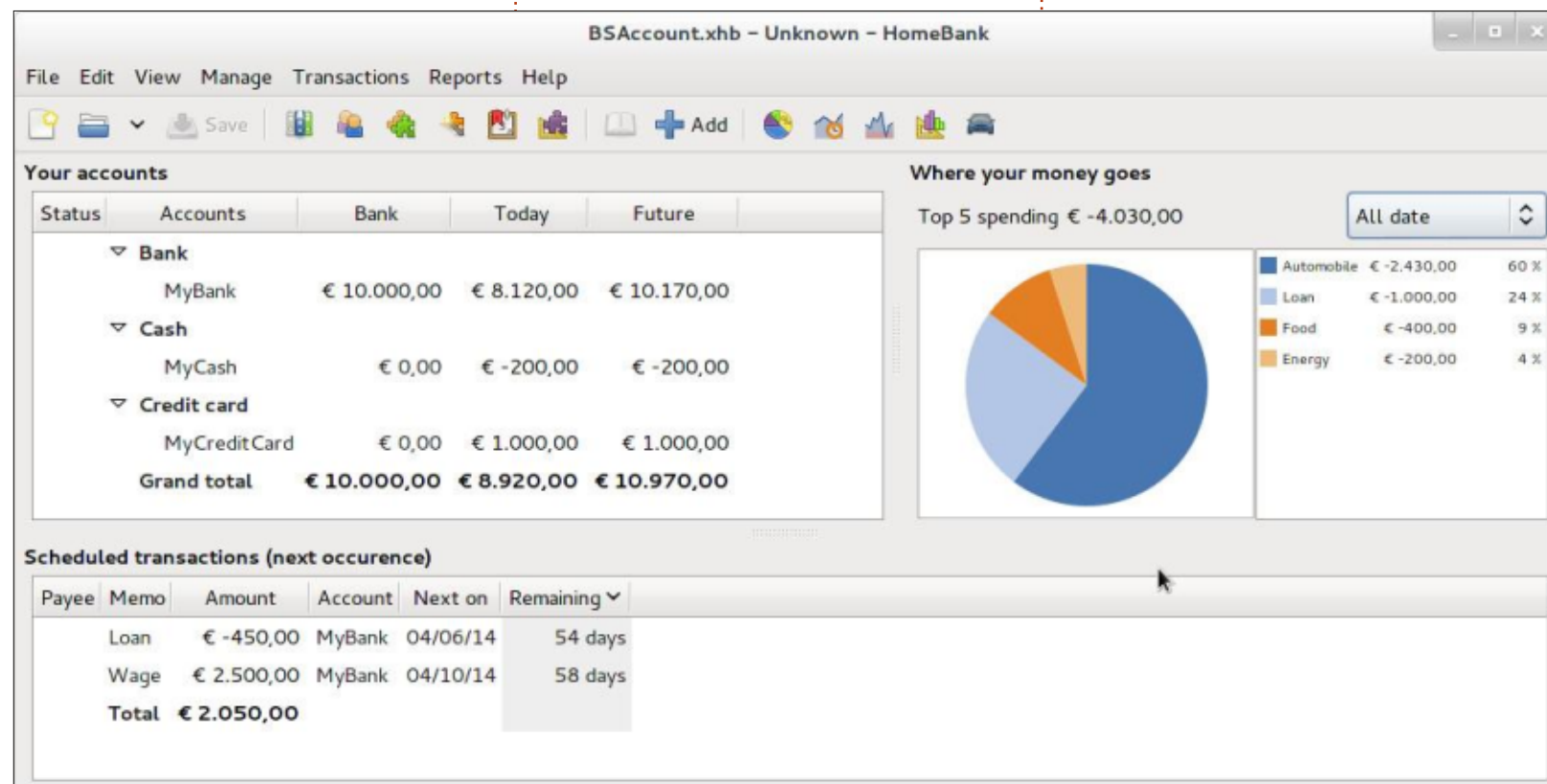
Budget for each month

☐ is the same

☒ is different

Month	Budget
Jan	-400.00
Feb	-400.00
Mar	-300.00
Apr	-200.00
May	-200.00
Jun	-250.00
Jul	-250.00
Aug	-100.00
Sep	-200.00
Oct	-250.00
Nov	-400.00
Dec	-400.00

☐ Force monitoring this category



REVIEW - HOMEBANK

There is a charting and reporting section which provides a bunch of reports and charts – very useful for immediate overview of our finances.

Sophisticated users might miss currency management and automatic/web bank connectivity. In order to keep the workflow simple, this accounting system is single currency and it is not possible to access web bank transactions or to receive

electronic bank statements, and consequently the reconciling task is not automatic.

If you are seriously thinking about controlling your personal finances and you want a simple tool, give HomeBank a try. While it is not the most sophisticated personal finance manager available on Linux, HomeBank makes it easy to keep track of your incomes and daily expenses. A clean and user-friendly interface, and the ability to

generate nice charts and reports, make HomeBank a very helpful tool. Furthermore, the setup is intuitive and the documentation is written with non-accounting people in mind.

The goal of simple personal financial management is fully achieved – it deserves a 5 stars rating in my opinion, but the incomplete installation I ran into means no examples and no predefined categories, both very useful for new users.



Name: **HomeBank** - version tested: 4.5.2 – last version on official site: 4.5.5

Official site:
<http://homebank.free.fr/>

Cost: free

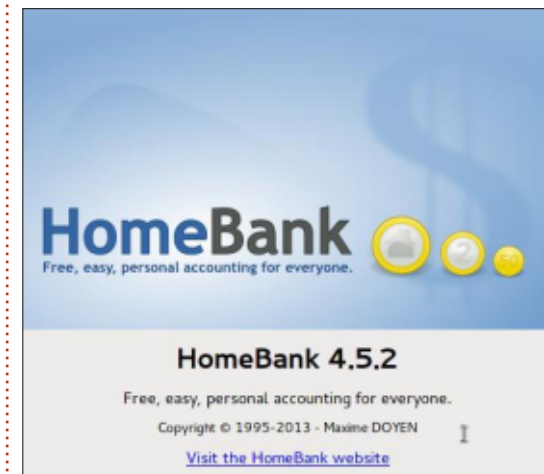
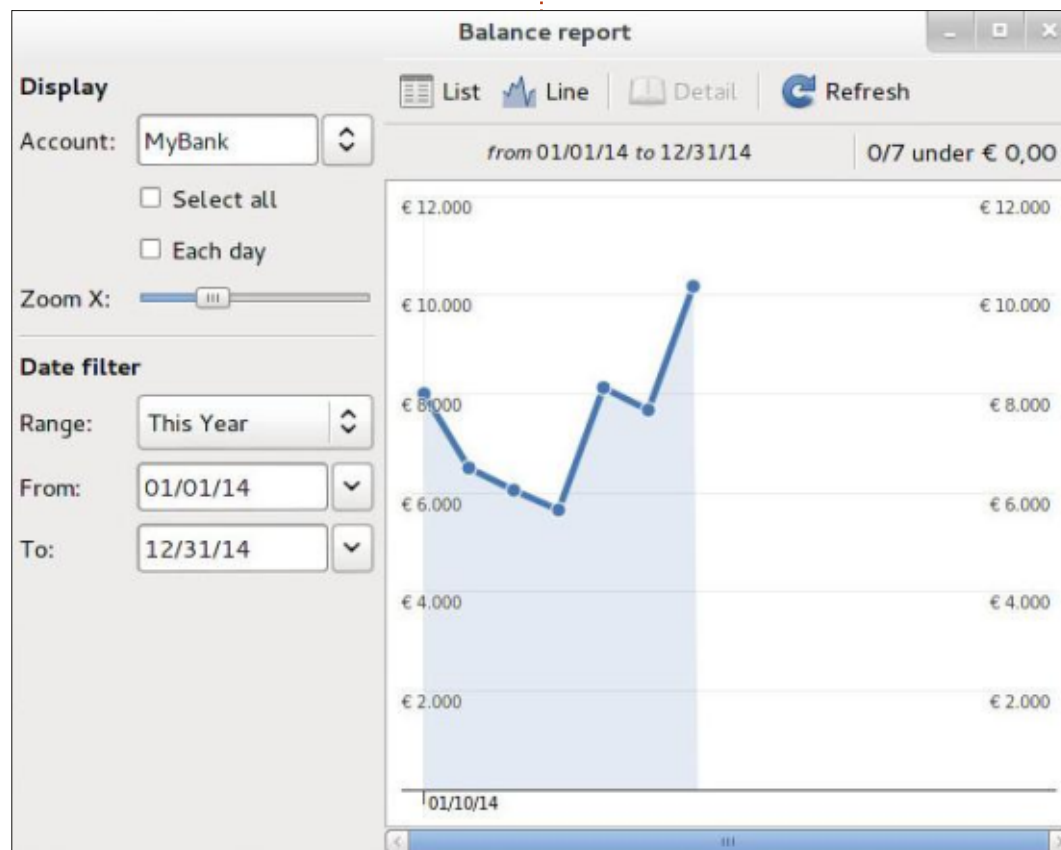
The good:

- it is easy to use
- set-up is fast and intuitive
- there's a good quality user manual
- it requires no or very limited accounting skills

- it is rich in transaction management: templates, scheduling, filtering
- charts and reports are available, with a special car expenses report
- it offers a simple budget feature

The bad:

- my installation was missing useful sample wallet and predefined categories
- single currency
- there are no web bank connection functions





WHAT IS

Written by Cuiv

Cryptocurrency Part 2

The ledger of transactions is protected by different mechanisms, but one of the main features used is a hash algorithm. The reason why will be discussed later. A hash algorithm is simply a function that maps any input of any length, into an output of a fixed length. A very simple hash algorithm would be: "count the number of characters in the input, and pad with leading zeros until you have 10 digits". For example, running "a word" through this algorithm would yield the result 0000000006. This algorithm would work only for inputs of less than 9999999999 characters, so in that sense it is a limited hash function that works only from a specific domain.

A hash function often used in online banking is SHA256, which maps any input to a binary output of 256 bits length (or 64 hexadecimal characters, the most common representation). It is very interesting, as it is very easy to generate a hash for any data input, is almost impossible to find collisions (two different inputs that

give the same output hash), the hash cannot be reverse-engineered to the original content, and of course the same input will always generate the same hash.

Another essential feature is that each input will give a completely different hash, even for a very small difference. "MyHash" and "myHash" will give completely different outputs.

ADDITIONAL SECURITY ISSUE: THE ORDER OF TRANSACTIONS

It is difficult to maintain an order of transactions. Because new transactions are continuously being propagated across the network, it would be possible for the following scenario to happen:

- transaction 1 is done, and starts propagating through the network
- transaction 2 is done 10 seconds later and starts propagating through the network
- a peer-to-peer node much closer to the origin of transaction 2 receives transaction 2 first and

transaction 1 later. For that node, the correct chronological order of transactions is transaction 2 -> transaction 1.

This is an issue, because it is critical to know the correct order of transactions to avoid double-spending.

For example, the following scenario can occur:

- a buyer pays for a product (transaction 1, referring to transaction A as input)
- seller ships the product
- the buyer sends a second transaction to themselves or a different public key they own (transaction 2, also referring to transaction A as input)
- because of speed of propagation of the transaction in the network, some nodes may receive transaction 2 before transaction 1, and therefore declare that transaction 1 is invalid because it double-spends transaction A.
- if the consensus becomes such, the seller of the product will not get paid because transaction 1 has been deemed invalid. The seller has

therefore shipped a product for free.

This also shows that it is difficult to obtain a consensus on the order of the transactions throughout the network.

The problem can only be solved if the entire network can agree on a transaction order.

TRANSACTION BLOCKS AND THE BLOCK CHAIN

The cryptocurrency answer to that has been to group transactions in blocks, which are chronologically ordered by their "height". The first block of transaction has a height of 0, the second block has a height of 1, the third a height of 2, etc. All transactions in one block are marked as having taken place at exactly the same time.

Therefore, blocks provide a chronological order of transactions, and the chain of blocks, dynamically validated by



the peer-to-peer network processing power is called the Block Chain. Transactions are worthless and are referred to as unordered or unconfirmed transactions, until they have been made part of a block.

A Transaction that has been put into the latest block is said to have been confirmed once. A transaction that was put into the block directly before that is said to have been confirmed twice, etc. The reason for that is important, and will be explained in the Block Chain Security sections.

SECURING THE BLOCK CHAIN: MINING

Of course there needs to be a system to agree on the order of the block chain, as well as to protect the block chain against any tampering (which would open the network to double-spend attacks).

The first way to avoid tampering is to ensure that each block contains simply a reference to the previous block, but not a block height. Therefore, with the exception of the very first block created, a block cannot be created

without having a direct parent, the previous block, and explicitly referring to that parent through that parent's block hash (the output of the hash function applied to a block). Block heights are deduced from this ordered chain of blocks.

Any node on the network can build a block from unconfirmed transactions it is aware of, and broadcast it as a suggestion of what the next block in the chain should be. Of course if every node in the network did that, there would be too many suggestions for new blocks.

One way to avoid getting many block suggestions is to make creating blocks difficult. And so a very difficult task is required of every block builder. With Bitcoin, a block is created in the following way:

- A node creates a block by grouping transactions and adding a reference to the previous block (the SHA256 hash of the previous block);
- A small random number (referred to as the nonce) is appended to the block;
- The whole block along with the nonce is passed through a SHA256

hash function with the block hash as output;

- Bitcoin requires that the hexadecimal representation of the block hash be inferior to a certain value (representing the difficulty of solving a block), which leads to block hashes having a certain number of leading zeroes, giving results like
0000000000000003bd7d2916ffa0d112d0797ffa9eef32ba62a219d215e02b55.

This kind of requirement is referred to as a proof-of-work requirement.

Because hashes are fully random, and generate completely different outputs with each different nonce, the only way to find a hash that satisfies the requirement of the network is to try nonce after nonce after nonce, until finally the hash of the block satisfies the requirement. This could take years and years for a standard desktop computer, depending on the difficulty chosen (linked to the number that the hashed value needs to be inferior to).

There is a reward system for a node that manages to create a

block with the correct hash: the node is entitled to put a transaction for a pre-determined amount to themselves in the list of transactions that make up the block. Currently the reward for solving a block, and making it part of the block chain, is 25 bitcoins, equivalent to 20,000 USD at time of writing!

The very first bitcoin block contained a single transaction for the block author, which was the reward for creating that block (at the time 50 bitcoins).

This whole process of creating blocks, which is very demanding computationally by having to check the block hash for each nonce value until a hash that satisfies the requirements is found, is called mining. Mining has two purposes:

- It helps secure the block chain by guaranteeing that very few block candidates can be generated at any given time;
- it mints new bitcoins by giving a reward to the node that successfully mined the block, and therefore puts more currency into circulation.

The block mining process also further secures the block chain

almost fully, but this will be explained after the next section, which describes how to deal with multiple block candidates, and introduces the concept of the longest chain.

SECURING THE BLOCK CHAIN: DEALING WITH MULTIPLE CANDIDATES

Consider the following scenario (arrows indicate a child block that refers to its parent block):

```
[Block 10] <- [Block 11]
```

The latest block generated is block 11. From this block 11, a miner can start working on submitting a candidate for block 12. For this, the miner gathers the unconfirmed transactions in his block, adds the block 11 hash in there, and starts checking nonce after nonce until he gets a hash output that satisfies the currency conditions.

Block 12 is thus created and added to the chain, assuming no other miner found a solution first:

```
[Block 10] <- [Block 11] <-  
[Block 12]
```

Now it so happens that at roughly the same time, two miners manage to create a candidate block 13 that satisfies the currency conditions. We have two chains that start getting broadcast around the network. This is referred to as a Block Chain Fork.

```
[Block 10] <- [Block 11] <-  
[Block 12] <- [Block 13A]
```

```
[Block 10] <- [Block 11] <-  
[Block 12] <- [Block 13B]
```

Depending on which block first reached them through the network, miners will try to find a child block to either Block 13A or Block 13B.

Assume that, very quickly, a miner manages to find a child block to Block 13B, while no such child block has been found for 13A, we now have:

```
[Block 10] <- [Block 11] <-  
[Block 12] <- [Block 13A]
```

```
[Block 10] <- [Block 11] <-  
[Block 12] <- [Block 13B] <-  
[Block 14]
```

This chain that includes Block 14 is now the longest, and Block 14 refers back to Block 13B. Block 14 starts propagating throughout the

network. Each node that receives it will understand that the longest chain available is now the one with Block 13B and Block 14, and will discard Block 13A as invalid. Therefore the block chain that includes Block 13B is now the official main chain.

Any transactions that were included in block 13A but not block 13B will go back to the pool of unconfirmed transactions. Block 13A didn't truly integrate the chain, the miner of that block does not receive any reward (because there is no record of the reward transaction in the main block chain), and therefore block 13A is referred to as an orphaned block.

This exposes a weakness in the system: a double-spend attacker could send some currency to themselves via Transaction 1 (referring to input Transaction A), and at the same time send currency to a product seller via Transaction 2 (also referring to input Transaction A, therefore double-spending it).

If Transaction 2 is accepted in Block 13A, and therefore gets confirmed once, the seller may ship the product immediately. If at the

same time Transaction 1 gets accepted into Block 13B, the following will happen:

- eventually Transaction 2 is put back into the pool of unconfirmed orders because Block 13A has been orphaned;
- however, at the same time Transaction 1 has been accepted as part of the main block chain. Because of this, Transaction A, which it refers to, is considered Spent.
- Once Block 15 starts being built, it will gather transactions. However, Transaction 2 cannot be included in the block, because it refers to Transaction A, which is already spent. Therefore the seller will have shipped a product for free.

Because of this inherent problem, when a seller accepts bitcoins, he will want to wait until transactions have been confirmed multiple times (are older in the block chain), to make sure that he is not the victim of such a scenario.

In Bitcoin, each block takes an average of 10 minutes to solve (and the difficulty is adjusted to maintain that). It is considered that waiting 6 blocks (6 confirmations) is a good way to ensure security,

which means that one hour is needed before a transaction is fully validated. This is pointed out (and rightfully so) as being one of the weaknesses of Bitcoin as a currency.

Other alternative coins have adopted shorter block times to fix that issue.

WHY IS THE BLOCK CHAIN SECURE?

We have seen that there are mechanisms to ensure that there is only a single version of the block chain propagated across the network, in the end, by enforcing the longest-chain policy (in case of a fork, the chain that generates the next block the fastest wins).

In addition, it is extremely difficult to tamper with the block chain (thereby enabling double-spend attacks) because each block contains as part of its payload the hash of the previous block.

Look at the following scenario:

```
[Block 10] <- [Block 11] <-  
[Block 12] <- [Block 13] <-  
[Block 14]
```

Say I want to change the official order of the transactions by having a transaction that was in Block 10 put into Block 14, enabling me to effect a double-spend attack. I can try to create a fork at the level of Block 10. To create that fork, I need to:

- create an alternate version of Block 10, Block 10B, containing the transactions I want, and the hash of block 9;
- to do so, I need to very quickly find a nonce that makes the hash of my new block fit the conditions of the currency (difficult);
- then I need to create block 11B, with the hash of Block 10B, finding the nonce;
- rinse and repeat until I create block 15B.

IF I have managed that feat BEFORE the true Block 15 from the main chain has been created, then my new fork will become the longest chain, and therefore be accepted as the main chain.

However, to do this, I need a lot of computing power. At least 50% of the total computing power in the network and more, as the origin point of my intended fork gets older. Currently, even the best super-computer in the world

cannot match 50% of the network, so we are effectively safe. Anyway, with that kind of computing power, it would probably be more profitable just to mine many coins rather than try to subvert the system.

CRYPTOCURRENCY PARAMETERS

In fact, a cryptocurrency has only a few main parameters:

- the block difficulty, which determines, on average, how much time it will take for the network to solve/mine a block (the block solving time);
- the interval after which the block difficulty will be adjusted. This is necessary because as the network grows, the computing power grows, and therefore if the difficulty remains stable, the amount of time to mine a block will decrease from the target. For Bitcoin, the interval is 2016 blocks;
- the reward for mining a block;
- the interval after which the reward is revised (to ensure a limited supply of currency). The reward is revised for Bitcoin every 210,000 blocks;
- the requirement method to mine a block, typically just specified as

the hashing algorithm used.

Note that cryptocurrencies usually have a target time for blocks. This target time for blocks is 10 minutes for Bitcoin, 1 minute for Primecoin. An interesting corollary is that the more computing power spent across the network mining a given coin, the faster the blocks will be solved, and thus it becomes more and more difficult to keep the block solving time fixed!

Most cryptocurrencies are similar, and use two main hashing algorithms:

- SHA256
- Scrypt (for which a Debian package exists)

Some other currencies have more original methods. For example, Quarks uses multiple hashing algorithms on top of one another and Primecoin uses the difficulty of finding prime number chains of certain types and whose mathematical origin satisfies certain criteria, such as being a multiple of the hash of the block, as the proof-of-work method.

We will go into details about what impact that choice has on

WHAT IS

mining in the next section.

Main sources:

- the bitcoin paper:
<http://bitcoin.org/bitcoin.pdf>
- the excellent, but fast-moving, under-the-hood explanation of bitcoin (this explanation follows roughly the same structure, but spends more time on some points and less on others):
<http://www.imponderablethings.com/2013/07/how-bitcoin-works-under-hood.html>
- the Primecoin paper:
<http://primecoin.org/static/primecoin-paper.pdf>
- an explanation of the paper:
[http://www.reddit.com/r/primecoin/comments/1rp5vx/could someone explain in detail the algorithm/](http://www.reddit.com/r/primecoin/comments/1rp5vx/could_someone_explain_in_detail_the_algorithm/)

COMPETITION



Win 500 Dogecoin (DOGE) by answering the following question:
There are two main hashing algorithms; SHA256 and _____?
(Hint: the answer is in the article)

Email your answer to:
ronnie@fullcirclemagazine.org
before Friday 18th April. The

winner will be notified via email for a valid Dogecoin wallet address.

A final 500 DOGE will be up for grabs next month, in the final part of this series, Cryptocurrency Part 3.

PYTHON SPECIAL EDITIONS:



<http://fullcirclemagazine.org/issue-py01/>



<http://fullcirclemagazine.org/issue-py02/>



<http://fullcirclemagazine.org/python-special-edition-issue-three/>



<http://fullcirclemagazine.org/python-special-edition-volume-four/>



<http://fullcirclemagazine.org/python-special-edition-volume-five/>



<http://fullcirclemagazine.org/python-special-edition-volume-six/>



FIRST DABBLE

I first dabbled with Linux back in the mid 1990's on an Amiga 1200 computer. I had previously tried BSD, but Linux looked like the way forward. I continued to play around with Linux when I moved on to an Intel-based PC in the late 1990's but never considered using it as an everyday operating system.

With the launch of Windows XP in the early 2000's, I soon forgot about Linux until one fateful day towards the end of 2004 – when a friend gave me an Ubuntu 4.10 livecd. I had never before heard of Ubuntu Linux, but soon learned all about Canonical, Shuttleworth, etc. For the first time, I experienced Linux in this easy-to-use, easy-to-install format.

I soon tried Ubuntu 5.04, Kubuntu, etc. and, by mid 2005, I was dual booting Ubuntu alongside Windows XP. Since then I have tried just about every Ubuntu variant & countless other distros. Now I have a dedicated Linux PC alongside my Windows 7 machine.

It is now interesting to see Linux being considered ever more as a suitable gaming operating system. This has led to rapid improvement in graphic hardware drivers and may lead to greater mainstream acceptance by end users. About a third of the people I know have already switched to Linux (mostly Linux Mint)! I for one can't wait to see what the future holds.

Jimmy Naidoo

I'M A CINEMATOGRAPHER

After I completed my studies in Celluloid, I discovered the digital world. So – not officially, but through the help of near ones, and my own exploration with much trial and error – I did some work on Windows with apps like Office, Adobe, Corel, etc.

After working with Windows ME, XP, VISTA and 7, I saw Ubuntu on my sister's laptop and got interested.

I became confident that any

multimedia production is possible with Ubuntu, and that home computing would be faster and more reliable.

Before, I heard that working with Linux was very very difficult for persons like me who have no computer knowledge – not even a single DOS command. But Ubuntu give me courage, and I used it with Windows 7 for a week, and then completely removed Windows.

I am now using only Ubuntu. My thinking was that, without Windows, there can not be any computing. It took me some time to switch to a new platform, but I stuck with it. You will be surprised what you have been missing over the years.

In India we believed for years that knowledge is never sold. It's only distributed, and the more you give, the more you get. (It's the opposite with money!). And I saw the same philosophy in the Ubuntu Community.

AURO KUMAR SAHOO

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ubuntuforums.org/forum-display.php?f=270

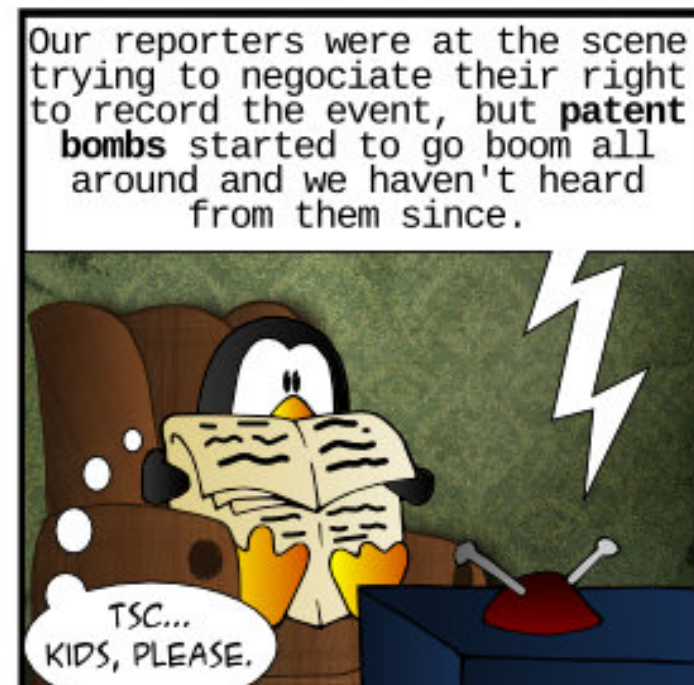
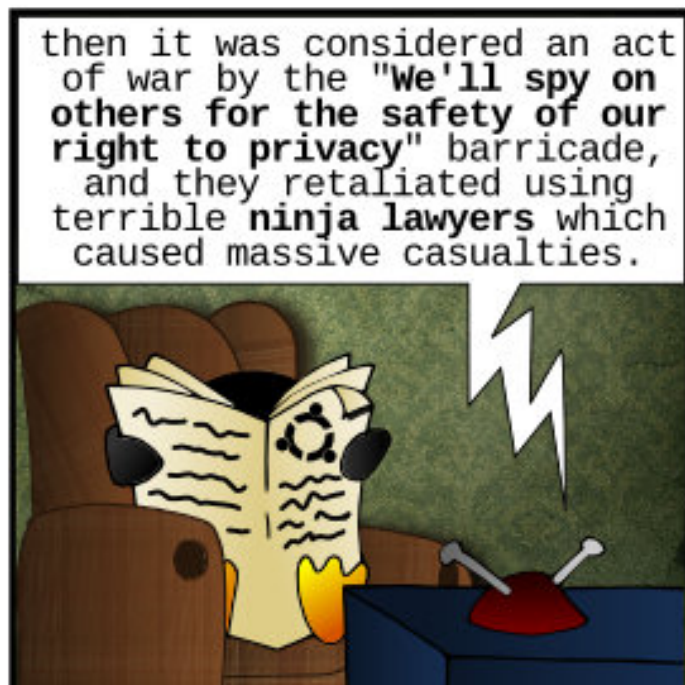
FULL CIRCLE NEEDS You!



Without reader input **Full Circle** would be an empty PDF file (which I don't think many people would find particularly interesting). We are always looking for articles, reviews, anything! Even small things like letters and desktop screens help fill the magazine.

See the article **Writing for Full Circle** in this issue to read our basic guidelines.

Have a look at the last page of any issue to get the details of where to send your contributions.





Q&A

Compiled by Gord Campbell

If you have a Linux question, email it to: misc@fullcirclemagazine.org, and Gord will answer them in a future issue. Please include as much information as you can about your query.

Q What is the best way to back up an Ubuntu machine? I basically want a complete backup of my internal hard drive, where if for any reason the internal hard drive fails I could simply replace it and restore from my backup.

A Déjà Dup is preinstalled in Ubuntu, and it's a sound choice. There are online tutorials on how to use it. If you want to make a full image of a hard drive, use Clonezilla. The two can be used together: for example, take an image of the hard drive as of Dec. 31, then take a backup of the entire Home folder as of Jan. 31, and then weekly "incremental" backups of all the files which have changed.

Q Is there a command I can use to stop my computer from suspending or turning off the screen?

A Yes: `xset -dpms`

You might want to experiment

with other parameters, to see what they are: `man xset`

Q When will the next Long Term Support release of Ubuntu be available?

A It's scheduled for April 17.

My personal preference is to wait a week or two after an LTS is released, then play with a Live USB, and finally do a fresh install onto my hard drive. I have separate root and home partitions, so if I specify everything properly during the install, my data is preserved -- but also see the "backup" question above!

Q I am trying to install this theme from [ubuntuthemes](http://ubuntuthemes.com) using MyUnity and it does not look like the screenshot?

A (Thanks to **3rdalbum** in the Ubuntu Forums) Themes only affect the look of the window borders, title bars and the look of

buttons, scrollbars, checkboxes, etc. Anything else you see in a theme like docks, desktop backgrounds, information displayed on the desktop, etc, are other things you would need to install.

To fully apply a theme, you do need to log out and log back in again. Until you log out and log in, some of the colors will be wrong.

Q I want to edit my website. Which tool can I use in Ubuntu?

A (Thanks to **spectatorx** in the Ubuntu Forums) For just HTML and CSS editing, my personal favorite editor is bluefish; you can find it in the Ubuntu Software Center. I also use it for some basic PHP and a few other languages.

TOP NEW QUESTIONS AT ASKUBUNTU

* 1 webcam for 2 programs
<http://goo.gl/vPNkuJ>

* How do I lower the critical temperature?
<http://goo.gl/sA533c>

* How can I know which DVDs will play on my system?
<http://goo.gl/xqAKGq>

* How can I remove a file that looks like a flag?
<http://goo.gl/rWAQWv>

* In gedit, what is the "file browser panel" plugin and what does it do?
<http://goo.gl/QmDwwM>

* How can I run "apt-get install" in the background?
<http://goo.gl/fZu5cF>

* How do I install Tox?
<http://goo.gl/0aZq4K>

* How can I protect a file from user changes?
<http://goo.gl/17apmY>

* Did I accept the tts-mscorefonts-installer EULA?
<http://goo.gl/3JjYl0>



TIPS AND TECHNIQUES



More info?

If you're asking for help, the most important thing you can do is provide relevant information about your system. There's a new kid on the block when it comes to system information programs: inxi.

The program has many options. To learn about them, open a terminal window and enter the command:

```
inxi -h
```

It's really a two-dimensional result, as -v modifies the other parameters -- plus the specialty options such as -h.

I'm delighted to see new system-information options. Does inxi unseat the defending champion? Not yet. To get the most, nicely formatted information, I still use these commands:

```
cd Desktop  
sudo lshw -html > config.htm
```

The file config.htm appears on

my desktop; I double-click on it, and the information appears in my default browser -- in great detail. However, inxi will tell you about temperatures, and that's one of my hot buttons.

REMOTE DESKTOP UPDATE

I recently wrote about Remote Desktop. Since then, I have switched to a different Remote Desktop client, KRDC. It's graphical, and it makes it easy to connect to any of the recent connections.

If you have never installed any KDE applications, it might install a large number of dependencies -- a small price to pay to get the KRDC goodness.



Gord had a long career in the computer industry, then retired for several years. More recently, he somehow found himself "The IT Guy" at a 15-person accounting firm in downtown Toronto.



Security

Compiled by Michael Boelen

If you have security-related questions, email them to: misc@fullcirclemagazine.org, and Michael will answer them in a future issue. Please include as much information as you can about your query.

From **Thomas Brooks**: As part of the hardening determination process, will Lynis offer the option to apply its suggestions? If necessary, will it download the appropriate tools (for example firewall) using APT?

MB: Lynis, in its current form, will be mainly focused on auditing a system and providing help to the owner of the system. Automatically hardening is possible, but due to the risks involved, won't be fully automated. For customers of the Lynis Enterprise version, however, scripts will be provided to assist in hardening, with main focus on configuration management tools like cfengine and Puppet.

From **Thomas Brooks**: Whitelists, even more than Blacklists, seem to be among the most useful tools in keeping a system from connecting up to a compromised server. Does Lynis offer any such support? Do you have any recommendations?

MB: Lynis is used for auditing and hardening a system. However, it does not harden the system itself. It is up to the system administrator to pick the right tools and

configure them according to the goals of the system. Whitelisting is a generic concept and usually better than blacklisting. The main reason is that you can define upfront what you want to accept, instead of deciding what is possibly bad. Several software packages support some ways of whitelisting, like iptables in which you define what information flows are allowed (and denying all others).

From **Jim Barber**: How do we detect and remove rootkits?

MB: Rootkits are a special case of malware (malicious software), as their main goal is to provide the attacker with a backdoor into the system, and, additionally, make detection as hard as possible. To avoid detection, rootkits will alter binaries, intercept special kernel functions, or just hide in plain sight (e.g. in /bin). So, to detect a rootkit, software needs to be a little bit smarter than the one who tried to hide it in the first place. It must use alternative or static compiled binaries, and different ways to find files (echo * and ls -l), and compare results, etc. In some cases, we get a

different result than expected, and that's usually a first sign to investigate the machine or the discovered binaries. Regarding removing: would you ever trust a system which was compromised? Sure, a file with a virus could be removed or cleaned. But if fatal parts of the system were replaced, or common binaries were backdoored, I would never trust the system from that moment. Best way to remove rootkits is by a fresh install of the machine and building it up properly.

From **Jim Barber**: Also, I have heard of a trojan horse that is currently in the wild for Linux. How can it be detected and dealt with?

MB: Trojan horses and backdoors are common on most platforms. The best way is to avoid them by not using untrusted software (e.g. not using software not in repositories). Malicious binaries can be detected with common malware detection tools like ClamAV, Rootkit Hunter, Chkrootkit, OSSEC, and file integrity tools like AIDE, Samhain and Tripwire.

From **Wade Smart**: [Regarding backdoor control of systems] How can I explain [to Linux users] the reality of what is possible compared to what is probable?

MB: The best way to explain to others what is real, is to find real malicious software and try it in a sandbox environment (e.g. a virtual machine without network connections). Surprisingly enough, there are many attacks (and samples) available, yet it takes some time to find or investigate them. Some are even hard to get them working! Backdoor control, in general, is always possible, especially if one achieved root access to the system. Can we trust the whole chain of people who worked on an operating system? Can we trust the compilers which build the binaries we are using? At some stage, we simply have to trust others. For normal Linux users, keeping their systems patched should be the number one priority. People who are still not feeling safe might switch to OpenBSD: less functionality, but more focus on security.





Open Source Design

Compiled by Jens Reuterberg



Design is a complex issue, it's a massive issue. It's so big that you can find more books than you can squeeze into a normal bookshelf on the subject of "What Design Is". It's so big that it can become overly complex to be usable.

So, personally I skip it, and boil it down to: "Design is Communication". I also skip the massive amount of text written on "What Communication Is" and boil that down to "Communication is the activity of a Community".

With communication you cannot avoid but be a part of a community; without it you cannot have one. When you exchange information you are a part of each other. If you can't exchange information you can never ever form a community.

So why is it that the act of creating communication - of design - is considered something best done either in isolation or by a dictator with scared designers? I use "his" because this aspect of creativity is a role often reserved

for (white) men - the lone genius toiling away with his grand scheme.

Now design is a matter of knowing what NOT to add to something - it's having a design language, a goal, and then staying true to that goal so as to make it unified. That all parts of the design follow this goal.

When you're an overlord whose word is law in a design group, this form of unity is easy. It's your vision or everyone is fired.

But then you leave. Sadly, you might die, or you might quit and leave behind is a group of underlings who are drilled, schooled and perfected in the art of following your every whim, anticipating your wishes and ideals, and defending their job through the act of obedience.

And the design work crashes. It crashes so bad that firemen would have to cut people out with the jaws of life from the wreckage of the design being done. Either the sudden freedom causes everyone

to joyously do whatever they feel like, or they will jockey for your vacant position, or they will simply flop around like a stunned haddock on the neo-modernist, white painted office floor.

What Open Source Development has shown us is that nothing can beat a community doing its work in the open, where as many as possible are invited to contribute, edit and change. To build on the work being done. Stand on the shoulders of giants.

If this flat work method has worked for programming, why is it that design efforts of the same ideal are met with exclamations of "Design by Committee"?

Yes, it's harder to build a community. It's harder being so clear with your vision that anyone can see it and understand it. It's really difficult when the design language needs to be defined in detail but I want to claim that it will always be worth it.

We have chosen to agree to a

description of What Design Is that tells us that it's an elite's game, it's something done by people better than us, with sharper slacks than us, using better headsets than us, while they use their media-training savvy to hand-gesture-talk to us from a stage about how good they are. Where the value of design is measured in the number of "convergences", "visual stories" and "engagements" that the designer can squeeze into a five minute Ted-talk-style presentation.

All it takes is that we all make an effort being inclusive, open, active and communicative. That we start a design project not just by making the best design available, but by being able to describe the design language we intend to use. The visions we're heading for.

The KDE Visual Design Group is based on these notions - everyone can and should be involved in the design work. I'll write a monthly column trying to go into the challenges and gains of this idea of Open Source Design. The wins and the fails.





An hour and a half ago I began playing a new video game; right now I'm trying to process the ending of the game. Wow! What a true gem of a game I found in "Serena," which was designed by Agustin Cordes and developed by Senscape, an independent game developer based out of Buenos Aires, Argentina. "Serena" was released on January 30 2014 through the "Steam" game engine for Windows, Mac OS X, and Ubuntu Linux. I actually found out about "Serena" after I saw it appear in my "Steam" library even though I hadn't purchased it. Many "Steam" users, including myself, had the game appear in our game library immediately following its release. It's a clever marketing design that "Steam" uses when it releases free new games so that players find out about them.

After clicking on the "Serena" game link from my library and finding out that the game was free and it would only take 500MB of space in my hard drive, I immediately downloaded it. The description available on the

"Steam" store page says that the game can be completed in an hour which made it even more appealing for me to want to play it.

So tonight, after a long day of work, I sat down to play "Serena." I began playing it and literally could not put it down. It's sort of reminiscent of "Amnesia: The Dark

Descent" in that the main character has no memory of what has happened and must look around for clues. You play the game with a mouse and keyboard, but mostly with the mouse. As you point and click your way through your isolated cabin, clues begin to manifest. It may appear as if nothing's happening and the story

is not progressing, but it is. The trick is to keep on clicking everything until each object begins to tell you the same things again and again; that's when you know it's time to move on to another object.

Without giving away too much of the game, I'll clue you in on a little secret: if you press the spacebar on your keyboard, little blue circles appear on the items that are meant to be explored. Once you feel you've clicked on everything, go back to the dining table, which is where the game begins, and look at the picture again. If you've explored everything, then Serena's face should not be blurred out anymore. From here on, you must go back and check on things a second, third or fourth time until eventually you open things that originally couldn't be opened and before you know it the game drastically ends. By the time the game ends, your jaw should have dropped so low that you may need a surgical procedure to put it back where it belongs.



I may be going out on a limb, but here it goes anyway: "Serena" may be nothing more than a sort of mini-game teaser meant to promote the upcoming game "Asylum" which is also designed by Agustin Cordes and developed by Senscape. I base my theory on three things:

"Serena" is a very short game that can be completed in less than an hour. Think of it as an appetizer meant to open your appetite before you're served the real deal.

The game is free, thus allowing everyone access to it. It's a kind of sampler that you get while you wait for the main meal.

There is a drawing found in one of the drawers that has the words "Waiting for Asylum" written on the back. This is the biggest clue of all.

Regardless of whether "Serena" is an hour long advertisement for "Asylum" or not, it is a great game all by itself. You've got to play this game! It's free, so you've got nothing to lose except for time and when you've finished it, you won't regret the short time you spent (not wasted) on "Serena."

CONCLUSION

Pro's

- The game is entertaining and short, which leaves you wanting more.
- The music, when it's heard, sets the mood accordingly.
- Clearly from the beginning, the game seeks to confuse the player,

and it definitely accomplishes that task.

- The quality of the dark, eerie, dimly-lit artwork and graphics throughout were not expected from a game with such low graphics requirements.

Con's

- The voice acting almost made me

put the game down at first, but, as I played, it began to grow on me and, towards the end, I couldn't imagine the game with a different voice. Although the voice acting may not seem like the greatest at first, give it a chance and don't be turned off by it, you'll be greatly rewarded if you stick with it.

- I can't help but give "Serena" a full 5 out of 5 stars.

System Requirements

Minimum System Requirements

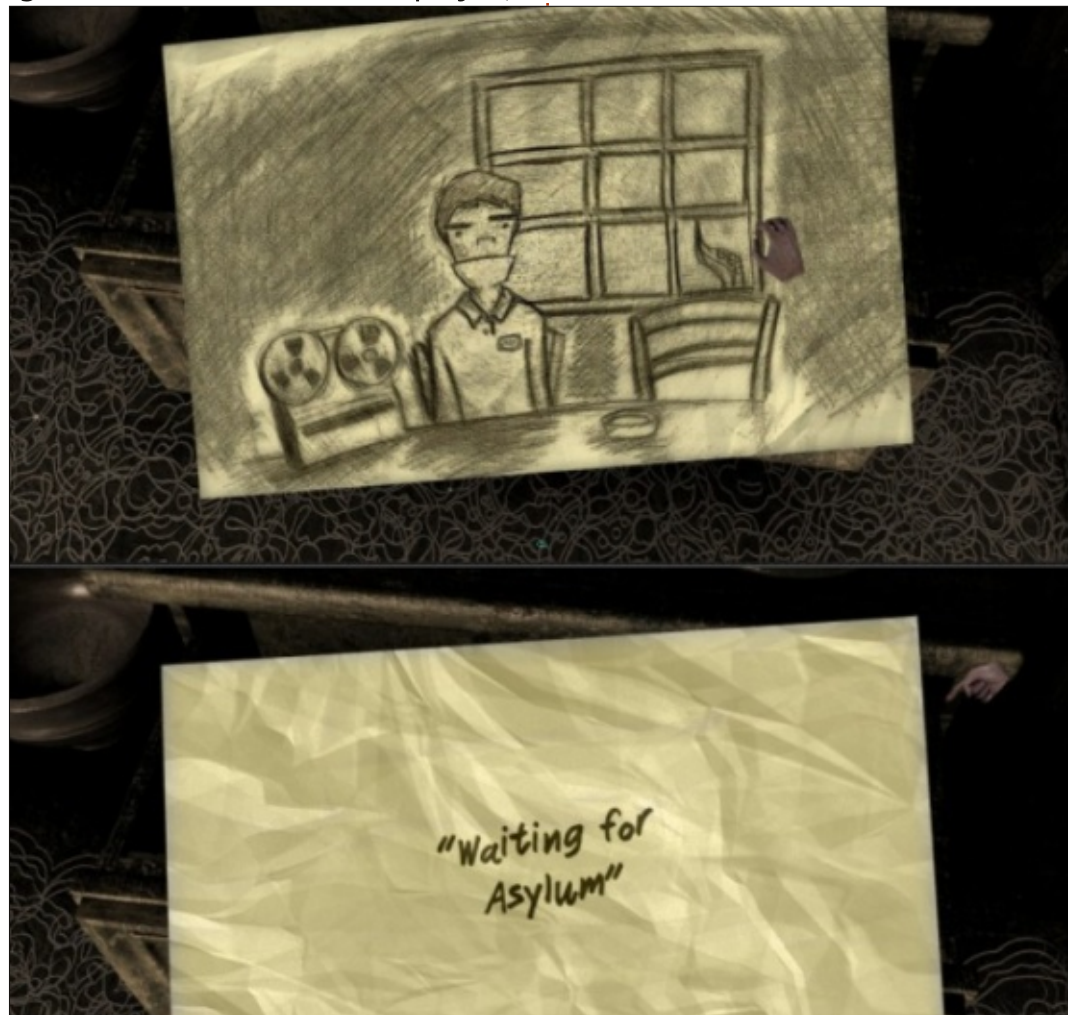
OS: Ubuntu

Processor: 1.6Ghz

Memory: 1 GB RAM

Graphics: OpenGL 2.0 compatible with 128MB

Hard Drive: 500 MB available space



Oscar graduated from CSUN, is a Music Director/Teacher, beta tester, Wikipedia editor, and Ubuntu Forums contributor. You can contact him via: www.gplus.to/7bluehand or email: www.7bluehand@gmail.com



An independent video game company, Freebird Games, brought out To The Moon in 2011; yes it is a little late but we Ubuntu users have just recently been able to play the game, and it is a worthy addition to the ever-growing collection of games that are playable on the operating system.

To The Moon has you play as two scientists who can grant any dying person's last wish; they can do this with a special machine that allows them to access the memories of the client and give them memories of something that they didn't do in real life.

The scientists latest client is Johnny – an elderly man who is comatose and has only days to live, and the two scientists have been called in to grant Johnny his last wish. Yes, the name does give it away but Johnny wants to go to the moon.

The gameplay is minimal and, if you are looking for a game to discuss its mechanics and how many different types they have put

into the title, you may want to look elsewhere as this is story driven. But, I implore you to give this game your time as this game is one of the few that capture your heart and play on every emotion – as you will want to see the conclusion to the story.

There are a few things that did bug me about the game; the unnecessary gameplay that they tried to fill the game with has its issues especially with the puzzles that it presents – it's basically "clicking to make an image". It does lag if you click too quickly. It may seem odd, but the lack of quality

and quantity of gameplay is not enough to dismiss this game entirely. The strength of the game lies in its story and through its soundtrack. The visuals will remind you of games like Chrono Trigger and the old Final Fantasy games, and this is best suited to this style as it has improved on that design



and has made it something special.

As with many readers of my reviews, a soundtrack is very important and Freebird Games have pulled me in with their glorious soundtrack, every mood comes across perfectly and placed in the exact spot where it matters. The music will move you, it has to be one of the best soundtracks I have heard in a while and this is something that I look for in games.

Its other strength is its writing and storytelling. It does stray into serious topics that it will frequently break up with genuine humor from the scientists. Both the dialogue as well as the characters grow on you, and become believable, and the overall message of the game is very powerful. To The Moon is a storytelling experience that very few games have accomplished, and is a work of art, and should be approached as such.



Oscar graduated from CSUN, is a Music Director/Teacher, beta tester, Wikipedia editor, and Ubuntu Forums contributor. You can contact him via: www.gplus.to/7bluehand or email: www.7bluehand@gmail.com



Full Circle Podcast Episode 39, Oggcamp Review

Our live episode recorded at Oggcamp on Sunday the 20th October in which the guys look back over the history of the event in this it's fifth anniversary



Your hosts:

- Les Pounder
- Tony Hughes
- Jon Chamberlain
- Oliver Clark and Freaky Clown

from the Blackpool (UK) LUG
<http://blackpool.lug.org.uk>

Download





MY DESKTOP

Your chance to show the world your desktop or PC. Email your screenshots and photos to: misc@fullcirclemagazine.org and include a brief paragraph about your desktop, your PC's specs and any other interesting tidbits about your setup.



This is a screenshot of my Desktop. I'm using Linux since 2004, Ubuntu since 2006, and from 2008 on a daily basis.

My recent setup: 2.2 GHz AMD, 4G Memory, 20" screen, 750G HDD.

I use Fluxbox as a window

manager, Cairo dock with Apple Icons, conky. I like Fluxbox a lot; is it highly configurable and very fast. I re-arranged the default Apple-wallpaper a little, so the Fluxbox

logo is visible.

nerdie



Here is the configuration of my laptop :
HP ProBook 6550b with an Intel core i3 M370, 6GB RAM, and a HDD of 320GB.

My operating system is Ubuntu 12.04.3 LTS 64-bit.

I've found the wallpaper in

gnome-look.org, I use Screenlets for the widgets I want to use, and Avant Window Navigator instead of Unity.

Jean-Yves Delavat



I have been using Ubuntu (current 13.10, on a HP TouchSmart PC) for more than a year after dropping Microsoft 100%. I had a couple of issues with Windows

programs (My Zune and My Windows Phone), but found satisfaction in Virtual-Box. So I keep only a few program icons on the desktop, using Cairo-Dock and

the Launcher to get at my stuff. I love the way you can resize icons to make mini pictures – in my case of friends and loved ones.

Brian Bogdan



OS: Linux Mint 16. Petra 64 bit
- Cinnamon 2.0
screen: 1920x1080 pixel
System: Gigabyte H61M-DS2
motherboard
Intel I3 3200 MHz 4x 64bit

processor
4GB RAM-4 1666 MHz memory
(AMD Radeon 6670 1GB DDR3
videocard) - abandoned
Western Digital 500GB HDD
Samsung 120GB SSD 840 EVO Basic

Usually I change my wallpaper
manually, using recent
astronomical images - to see and
feel the beauty of the Universe.

T. Kovács Áron



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